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Agricultural-Food Policy Review:

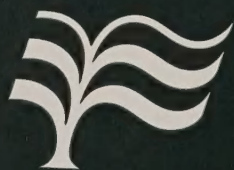
Perspectives for the 1980's

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Agricultural-Food Policy Review: Perspectives for the 1980's. Economics and Statistics Service, U.S. Department of Agriculture. AFPR-4.

Preface

The nine articles collected here provide background for discussions on new legislation to replace the Food and Agriculture Act of 1977, which expires this year. New legislation will be influenced by the much altered nature of U.S. farming.

- Almost all easily available cropland, including that once idled by farm programs, is now back in production. Millions of acres of potential cropland remain, but are not as productive or need to be improved (cleared, drained, irrigated, for example).
- The long period of overproduction, burdensome surpluses, and depressed farm prices now seems to be behind us, although there may still be occasional years of excess production.
- International food needs now heavily influence the well-being of U.S. agriculture in any given year.
- The character of U.S. farming has changed as fewer but larger farms now produce most of our total agricultural production.

Agricultural-Food Policy Review is an occasional publication that addresses important policy and legislative matters pertaining to agriculture and food.

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Abstract: The eighties are likely to show continued strong growth in foreign demand for agricultural products, but reduced growth in foreign production. Hence, growth in the rest of the world's demand for U.S. products is likely to continue strong, possibly near the record rates of the seventies. With both foreign and domestic demand for U.S. farm products likely to increase, the eighties could well be a period of transition from the overproduction and burdensome surpluses of the fifties, sixties, and early seventies to a time of full capacity production and tighter supply/demand balances by the nineties.

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relationship to other sectors will grow in importance. Protecting natural resources will influence current and future program design. Marketing quotas and allotments, although effective in promoting higher farm incomes, have inherent side effects that will invite scrutiny. Loan programs, serving as a cash flow and marketing management device for many farmers, will most likely be continued. Other commodities' (sunflower, hogs, cattle) need for Federal programs will likely be debated.

The Setting for New Food and Agricultural Legislation. *Douglas E. Bowers* 120

Abstract: Events such as the grain embargo against the Soviet Union and escalating production costs have caused farmers to increase their demands for Government aid. Within Government, however, the influence of agricultural groups has declined over the past decade as other interests have asserted a greater role in agricultural policy-making. Among farm groups themselves, specialized commodity associations have been winning power at the expense of the general farm organizations. The outlook for new agricultural legislation depends on whether farmers can reach a unified position and on the extent to which inflation, the budget, conservation, structure, and other issues are major questions when a new bill is considered.

Food and Agricultural Policy: A Suggested Approach. *John E. Lee* 136

Abstract: Current U.S. food and agricultural policies comprise an amalgamation of individual, often conflicting, programs and policies, many conceived 50 years ago. The subsequent industrialization of agriculture, ensuing changes in the U.S. food system, and the current tight world food outlook make this a good time for a fundamental reevaluation and reformulation of the objectives of agricultural policies. This article suggests an approach and some criteria for that. The alternative is to continue the incremental patching and mending of existing policies. But even that approach will benefit from a clear articulation of the policies' ultimate goals.

Foreword

This collection of articles explores the direction being taken by U.S. agriculture and the associated implications for people and for policy. Each article draws a perspective on an aspect of the economic and policy setting that is important to the consideration of legislation to replace the Food and Agriculture Act of 1977. That act expires in 1981. The topics move in sequence from the global food economy to specific domestic policy issues, and conclude with a suggested policy framework for treating the relevant issues in concert. This provides an overview of the emerging economic conditions of international and domestic agriculture and some policy issues implied by those conditions.

The lead paper sets the stage for the others by examining the tightening global and domestic balance of supply and demand for food. With food demand in the rest of the world likely to continue to increase faster than production, agricultural trade must increase to fill the shortfalls. The United States is the major agricultural exporter; the implication is for continued growth in volume and value of U.S. exports as other countries grow increasingly dependent on this Nation for food. Most of the better land on U.S. farms is now back into production. Continued modest growth in domestic demand and strong growth in export demand may outstrip the potential for increased farm output coming from yield increases over the next decade. U.S. agriculture is thus in transition: from 60 years of chronic oversupply and depressed prices and all the attendant adjustment problems to a new era characterized by production encroaching onto increasingly marginal and fragile lands, rising production costs and food prices, and other problems and issues attending relative scarcity. The paper discusses some of the economic and policy implications posed by such a transition.

The second paper addresses the changing reality of the U.S. farm sector, examining the structural and performance characteristics of the farm sector, its firms, and associated households. A profile emerges showing a sector with a large number of firms and households nominally engaged in agricultural production but collectively producing little of the total farm product and receiving little from traditional farm programs. But the people involved are usually not poor. Sharing the name "farmer" with these people, but with few other similarities, is a small number of producers who control most of the farm resources, produce most of the output, receive most of the benefits of Federal farm programs, owe most of the farm debt, and buy most of the farmland sold each year, making them the foremost entrepreneurs of farm consolidation and structural change. The average farmer in this latter group, together about 20 percent of the total, has achieved most economies of size, has income considerably above the median nonfarm family income, and has returns from farming and from real gains in asset values which exceed comparable rates of current incomes and capital gains from common stocks and bonds. The paper examines the implications of this profile, one that is far different from that which gave rise to the farm policies and programs of the past 50 years.

The eighties are likely to be characterized by continuing concern about the pervasive influences of inflation and its uneven consequences. No perspective on the decade would be complete without taking note of this phenomenon. The third paper explains

why several food and agricultural policy issues have their roots in inflation or are exacerbated by it. The paper examines the impact of inflation on the financial behavior and well-being of farmers and others and describes how inflation changes the consequences of several public policies including tax, credit, and farm commodity policies. Inflation is of particular significance to agriculture because of its effect on the value of the primary farming asset, land.

With the global and domestic setting provided by the first three papers, the fourth and fifth papers examine two different aspects of our capability to respond. The fourth paper looks at factors likely to determine our capacity to produce agricultural products. The supply of cropland and incentives needed to bring additional land into production are closely examined. Millions more acres of land are available, but development and production costs could only be met by higher commodity prices.

Transportation will not be the bottleneck that limits exports in the years just ahead, according to the fifth paper. Serious problems face the three major modes of agricultural transportation (higher fuel prices and deteriorating roads and bridges for trucks, limited lock and dam capacity on the waterways, and rolling stock shortages and declining railbed mileage and condition for railroads). But such problems could be alleviated with longer term planning, investment, and changes in regulatory policies. Port capacity is apparently adequate for the next 5 years to handle the expected increases in export demand, and the internal transportation system will manage to get commodities to ports, albeit at higher costs for some farmers. Commodity storage capacity has increased greatly in recent years, primarily on farms, adding flexibility to the transportation system. Storage near sites of production rather than in central terminals and ports improves harvesttime flexibility for farmers but increases the difficulty in responding to short-term fluctuations in export demand.

The sixth paper focuses on food aid and trade policy issues likely to be important during the eighties. It notes the current state of protectionism in international grain and soybean markets and points out that these policies vary widely by country. The net effect is to reduce responsiveness of consumption or production to price changes, thereby adding instability in international prices—instability that must be absorbed by U.S. producers and consumers. The feasibility of a U.S. export marketing board is also examined. Under the conditions postulated, a marketing board would probably exacerbate price variability and reduce producer incomes. The pros, cons, and viability of several international food aid proposals are also analyzed.

The emerging supply and demand conditions and the changing makeup of U.S. agriculture profiled in the first two papers imply that farm and commodity policies may need to address a different set of problems. The seventh paper identifies some of the issue areas confronting commodity policy: instability in an interdependent international economy; side effects of some of the regulatory aspects of past commodity programs; protection against natural and economic disasters; and designing programs that are simple to understand and manage and which permit as much managerial freedom and market flexibility as possible. The authors review three alternative concepts which have evolved to meet program objectives—price supports and marketing quotas; price support loan programs; and voluntary programs—and analyze their strengths and weaknesses for dealing with the issues and realities of the eighties.

The eighth paper takes an historical look at the social and political environment that has shaped agricultural legislation and the characteristics of that environment likely to be important in 1981. Based on extensive interviews with constituent groups, the paper examines the policy process and the participants—people and organizations—in that process.

The final paper outlines a broadened policy framework for dealing with disparate, fragmented issues and concerns growing out of the changes suggested in the earlier papers. After reviewing the issues and concerns that converge under the general rubric of “food and agricultural policy,” the paper presents a list of policy goals that appear to be widely espoused and that would be consistent with an overall policy objective of assuring food security and the nutritional well-being of the Nation’s population. The paper suggests some criteria for sorting out priorities among goals of food and agricultural policy. It also illustrates how a well-understood and accepted food policy could provide a clearer sense of mission and direction to major program components of the U.S. Department of Agriculture and serve as a powerful tool for effective program management.

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Global Prospects

Global Prospects for Agriculture

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World agriculture changed dramatically during the seventies. Trade linkages across countries and macroeconomic linkages between farm and nonfarm sectors grew significantly, both in complexity and in importance in determining the well-being of agriculture. The Food and Agriculture Act of 1977 recognized the particular importance of these changing relationships to the United States. The act broadened U.S. agricultural policies to treat both the conventional resource disequilibrium problems of the fifties and sixties and many of the newer, linkage-related problems that emerged during the first half of the seventies.

Developments since 1977¹, including a second export boom and ongoing changes in the structure of agriculture, have made the well-being of our farm and food sectors even more dependent on these trade and macroeconomic linkages. Hence, new farm and food legislation will have to take even greater account of trade prospects and the macroeconomic outlook here and abroad than did the 1977 Act.

This article speculates on the trade and macroeconomic outlook for the early eighties and their implications for the upcoming agricultural policy debate. The first section of the article—"Foreign Supply, Demand, and Trade: Trends and Prospects"—outlines the major supply and demand factors that are likely to shape world agricultural trade in the early eighties. The second section—"Implications for U.S. Agriculture"—speculates on the implications of what may be an increasingly tight world agricultural supply/demand balance for the United States. The third section—"Implications for the Policy Agenda for the Eighties"—summarizes the major conclusions and identifies what are likely to be several key policy issues in the debate on new farm legislation.

This article concludes that the agricultural policymakers of the early eighties face the difficult task of easing the transition from the abundant supplies of and excess capacity to produce farm products that characterized U.S. agriculture

over the last several decades toward the gradually tightening supply/demand balance likely in the late eighties and nineties.

The strong growth in foreign and domestic demand and slowed growth in supply described below suggests that we are already well into this transition at the start of the eighties. If U.S. agriculture is to meet the growing demand for its farm products here and abroad in the first half of the eighties, our agricultural plant will have to run far closer to capacity than at any other time over the last several decades. Our ailing agricultural marketing and transportation systems will have to handle volumes substantially greater than the record levels of the late seventies.

Questions of how to manage the farm sector so as to meet this expanding demand for our agricultural products without sacrificing broader economic, social, and environmental goals will become more important as this transition progresses. The developments of the last decade point to several basic questions already being raised—questions such as how to manage our agriculture to minimize the inflationary impact of rising food prices and increased farm demand for scarce resources, both renewable and nonrenewable. As the eighties progress and population- and income-generated growth in demand here and abroad tends to outpace growth in our capacity to produce, the longer range issues of resource management and productivity growth will become increasingly important.

Agricultural policymakers are also likely to face a worsening problem of market instability. Temporary periods of alternatively excess and tight supplies are likely to make market stabilization a U.S. policy concern second only to easing the transition toward a tighter world food balance. As pressure to expand agricultural production forces producers abroad to expand cultivation into more marginal areas, interannual fluctuations in yields and, in turn, in supply and import demand are likely to widen significantly. With restrictive trade policies insulating an increasingly large proportion of the world from equilibrating adjustments in quantities and prices, more of the burden of stabilizing the world market will fall on the United States. Hence, the question of how to stabilize our domestic market while facilitating short-term adjustments in resource use, as well as the question of how

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to maximize the return on increasingly costly exports, will also come to the fore.

Fuller use of our agricultural resources will not necessarily guarantee adequate returns to farmers. The cost of producing agricultural products is likely to increase sharply in nominal terms, possibly in real terms, while prospects for offsetting productivity gains are limited. Moreover, interannual swings in foreign demand in the early eighties are still likely to be large enough to shift the supply/demand balance temporarily back toward surplus and to slow, possibly reverse for a year or two, the real price increases consistent with fuller use of our resources. Farmers could well be caught temporarily between lagging or depressed prices and rising unit costs of production. Hence, programs to stabilize—rather than enhance—returns to farmers, and programs to manage commodity reserves to keep the market in balance during short-lived surpluses and to minimize disruptions during increasingly frequent periods of tight supplies will play an enhanced role.

The challenge of at least the early eighties will be to design policies and programs flexible enough to address all of these very different problems. While the mechanisms used to address these issues may not differ significantly from many of the programs used in the past, their emphases will have to shift markedly. Among the most pronounced changes in emphasis will likely be a shift from enhancing returns to a farm sector troubled with too many resources to generate socially acceptable incomes toward stabilizing returns to a sector in balance but facing widening swings in demand for its products. Also pronounced will be a further shift in emphasis from commodity-specific supply management programs to sector-wide capacity management and development programs. Also likely is a pronounced shift toward greater interest in agriculture's relationship with the rest of the economy, particularly in the areas of risk sharing, resource use, and inflation. Specific programs will also have to be developed early in the eighties to address two particularly pressing problems—overhauling the ailing transportation system, especially its agricultural component, and ordering the maze of energy programs dealing with agriculture.

The changing global situation likely in the early eighties will also make it imperative that the United States reassess its international agricultural policies to reflect the world market's transition from a buyer's to a seller's market. At issue will be the appropriateness of policies and programs developed to meet the needs of a farm sector facing excess capacity at home and a buyer's market abroad after these basic circumstances have changed. Also at issue will be just what role exports will play in our agricultural sector and what return from overseas buyers will be needed to meet the increasing resource and market costs of producing for export.

Among the specific policies to be reviewed are our stand on trade relations with other countries—particularly our policies on trade liberalization and marketing arrangements—and our position on international reserves, food aid, and agricultural development assistance. Our policy review in these key areas should focus on designing programs to ensure a more equitable sharing of the costs and benefits of trade and a more equitable sharing of international aid responsibilities. Also at issue will be the need for, and focus of, our export promotion programs. The need for export promotion programs will will quite likely be greater than at any time in the recent past, not so much to expand exports but to channel foreign demand toward those products that put the least pressure on our resource base and offer the highest value added.

The day-to-day operation of the food and agricultural programs developed for the first half of the eighties will also become more critical. In virtually all the domestic and foreign agricultural policy areas noted above, the margin for error in program implementation will narrow significantly as we use more of our resources more intensively to produce agricultural products and as the world grows more dependent on our output. But given the range of problems likely in the eighties, the return on effective use of agricultural policy will be greater than ever before.

Foreign Supply, Demand, and Trade: Trends and Prospects

Postwar increases in the number and complexity of the trade relationships linking U.S. agriculture to the rest of the world have resulted in a gradual internationalization of American agriculture. The pace of this internationalization accelerated markedly in the seventies. Over the span of a decade, foreign demand for our agricultural products grew to account for 1 acre out of every 3.5 acres planted and 28 percent of all agricultural products marketed. This compares with less than 1 acre out of every 5 and about 12 percent of marketings at the end of the sixties and less than 1 acre out of every 5.5 and less than 10 percent of marketings at the end of the fifties. Over the seventies, while our domestic demand expanded by 1.5 percent annually and our output grew by 2.8 percent per year, foreign demand for our agricultural products grew by over 8 percent per year.

This internationalization of U.S. agriculture has had impacts far beyond simply increasing the volume of our exports. Over the last decade in particular, U.S. agriculture has taken on many of the structural demand and supply characteristics of the world market. The state of U.S. agriculture has come to depend in a very real way on the changing nature of agricultural production and shifts in food, feed, and fiber demand around the world.

The foreign supply and demand prospects noted here suggest that this internationalization of U.S. agriculture will continue in the eighties—albeit at a somewhat slower pace than in the seventies. Should foreign demand for U.S. products grow at even the low end of the 5 to 7 percent per year range likely over the next 5 years, trade will become an even more dominant determinant of both the state and well-being of our agriculture.

Historical Perspective

The period from the early fifties through the early seventies was generally one of strong, steady—albeit unevenly distributed—growth in world food production and unprecedented gains in consumption even after adjusting for population growth. By the early seventies, world per capita food intake had increased to 108 percent of the minimum cited by the United Nation's Food and Agriculture Organization (FAO) as necessary to allow normal activity and good health in adults and to permit children to reach their potential body weight in the absence of disease. This compared with about 104 percent in the early sixties and slightly below 100 percent in the early fifties.

Two basic characterizations of this overall improvement in the world food situation are called for. First, improvements were unevenly distributed. Despite strong global gains, large numbers of people in the low-income countries of Asia, Africa, and even Latin America faced stagnating or declining per capita food availabilities. Hence, while per capita food intake worldwide increased substantially and the calorie gap appeared to be closed, hunger and malnutrition persisted. The absolute number of hungry people increased from possibly 100 to 200 million people in the fifties to 600 to 800 million by the seventies; the volume of products needed to fill their unmet basic human needs swelled from the equivalent of possibly 50 million tons of grain to 140 to 150 million tons.¹

Second, and more important from the perspective of this article, this overall improvement in the world food situation was due in large part to increased dependence on trade. Trade in food—supplied to an increasing extent by a few exporters like the United States—expanded at roughly twice the pace of growth in production and consumption (table 1). The grain and oilseed tonnages shown in table 2 and figures 1 and 2 put these world production, consumption, and U.S. trade developments into perspective. Production of grains and oilseeds outside the United States increased from nearly 550 million tons in 1950 to 1,230 million tons by the late seventies. Foreign disappearance grew appreciably faster—from

555 to over 1,350 million tons—due to growth in U.S. exports from 14 to 145 million tons.

While trade in selected other items, such as cotton and tobacco, was slower over the same period, exports of items such as livestock and specialty products grew fast enough to keep total U.S. exports expanding by 6 to 9 percent per year. This unprecedented growth in trade reduced the rest of the world's self-sufficiency, measured in terms of their domestic food production as a share of food disappearance, from 98 percent to 89 percent.

Despite sharp increases in the volume of products traded over the last three decades, gains in productivity kept the food exporting countries' capacity growing as fast as or faster than world demand; as a result, real prices actually trended downward and the world market continued to be a buyer's rather than a seller's market. At home, the agricultural sector adopted technological advances in the form of new machines and improved farming methods, continued land development, and experienced changes in the structure of the farm sector itself. The expansion in domestic demand for farm products

Table 1—World agricultural production, consumption, and trade growth rates

Item	Compound annual growth rates		
	1950-80	1950-72	1972-80
	<i>Percent</i>		
World:			
Production	2.70	2.85	2.35
Consumption	2.70	2.85	2.35
Trade	5.30	4.95	6.25
Per capita production	.85	.95	.50
Per capita consumption	.85	.95	.50
United States:			
Production	2.15	2.05	2.80
Consumption	1.70	1.90	1.20
Trade	6.40	5.50	8.90
Per capita production	.75	.55	2.00
Per capita consumption	.45	.45	.45
Foreign:			
Production	2.80	2.95	2.30
Consumption	2.85	3.00	2.55
Trade	4.95	4.70	5.65
Per capita production	.90	1.00	.45
Per capita consumption	.95	1.05	.70

Sources: USDA World Agricultural Production and Trade Indices and FAO Agricultural Production and Trade Indices.

¹ See *Report Assessing Global Food Production and Needs as of April 15, 1979*. ESCS-61, U.S. Dept. Agr., Econ. Stat. Coop. Serv., October 1979.

Table 2—World grain and oilseed production, consumption, and trade

Year ¹	World production and disappearance ²	Foreign production	Foreign disappearance	U.S. production	U.S. consumption	U.S. exports
<i>Million metric tons</i>						
1950-54	742.2	595.1	609.4	147.1	127.6	14.3
1955-59	882.4	710.0	735.5	172.4	139.0	25.5
1960-64	984.0	791.4	833.6	192.6	156.0	42.2
1965-69	1,159.4	931.3	984.9	228.2	174.1	53.6
1970	1,254.1	1,031.8	1,089.1	222.3	186.7	57.3
1971	1,358.0	1,084.5	1,145.7	273.5	224.5	61.2
1972	1,319.2	1,050.8	1,148.4	268.4	196.9	97.6
1973	1,425.8	1,140.1	1,230.1	285.7	208.3	91.0
1974	1,386.4	1,143.5	1,228.6	242.9	161.3	85.1
1975	1,418.6	1,123.9	1,228.8	294.7	179.1	104.9
1976	1,520.0	1,223.7	1,323.5	296.3	175.4	99.8
1977	1,533.1	1,214.2	1,334.4	318.9	184.5	120.2
1978	1,660.2	1,331.3	1,456.4	328.9	202.3	125.1
1979	1,577.0	1,207.0	1,352.5	370.0	211.3	145.5

¹ Data quoted on commodity marketing year basis.

² World production equals world disappearance.

Source: *World Agricultural Situation*, various issues, 1978-1980, U.S. Dept. Agr., Econ. Stat. Coop. Serv.

was at the same time relatively slow. This combination resulted in sustained growth in the supply of farm products at a pace faster than growth in demand. The result was “disequilibrium” in agriculture—too many resources, especially human resources, devoted to food and fiber production. Rather than a temporary maladjustment, the problem was made chronic by the limited alternative uses available for the natural resources used in agriculture and the slow rate at which excess labor flowed out of agriculture.

It was against this international backdrop that the major U.S. agricultural policy decisions of the postwar period were made. Given slow growth in foreign and domestic demand relative to growth in capacity, as much as 65 million acres—a quarter of our agricultural resource base—were held out of production to keep world and U.S. agricultural supply and demand in approximate balance. Farm policies were designed and specific commodity programs were administered to ensure equitable, generally enhanced, returns to farm factors while assuring consumers here and abroad abundant supplies of reasonably priced agricultural products.

The middle and late seventies stand in sharp contrast to the previous 20 to 25 years. The last 8 years were marked by slowed growth and increased interannual variability in production and consumption as well as a marked increase in world

food trade. Five of the eight largest shortfalls and windfalls in world food production and disappearance were reported between 1972 and 1980. Contrary to the first 25 years of the postwar period, prices fluctuated widely and hit real postwar highs and lows within the span of a half decade. The policies of many major countries, particularly the Soviet Union, toward responding to food shortages also abruptly changed to favor large imports and added to world instability.

These developments, in combination, significantly increased the rest of the world's dependence on a few exporters. Of all the exporters, however, the United States proved most responsive to changing foreign needs. Moreover, our foreign exchange rates were realigned which tended to increase the competitiveness of U.S. products in foreign markets at the same time growth in foreign demand accelerated. By the end of the seventies, the United States had committed to production for export virtually all of its readily available capacity including acreage held out of production for more than two decades.

Equally significant were a number of less dramatic longer term domestic developments such as the gradual loss of agriculture's excess labor. It is now rather widely accepted that land and labor disequilibrium ceased to be a problem at the start of the decade. Evidence from the early seventies—the

Figure 1

World and foreign production and disappearance of grains and oilseeds

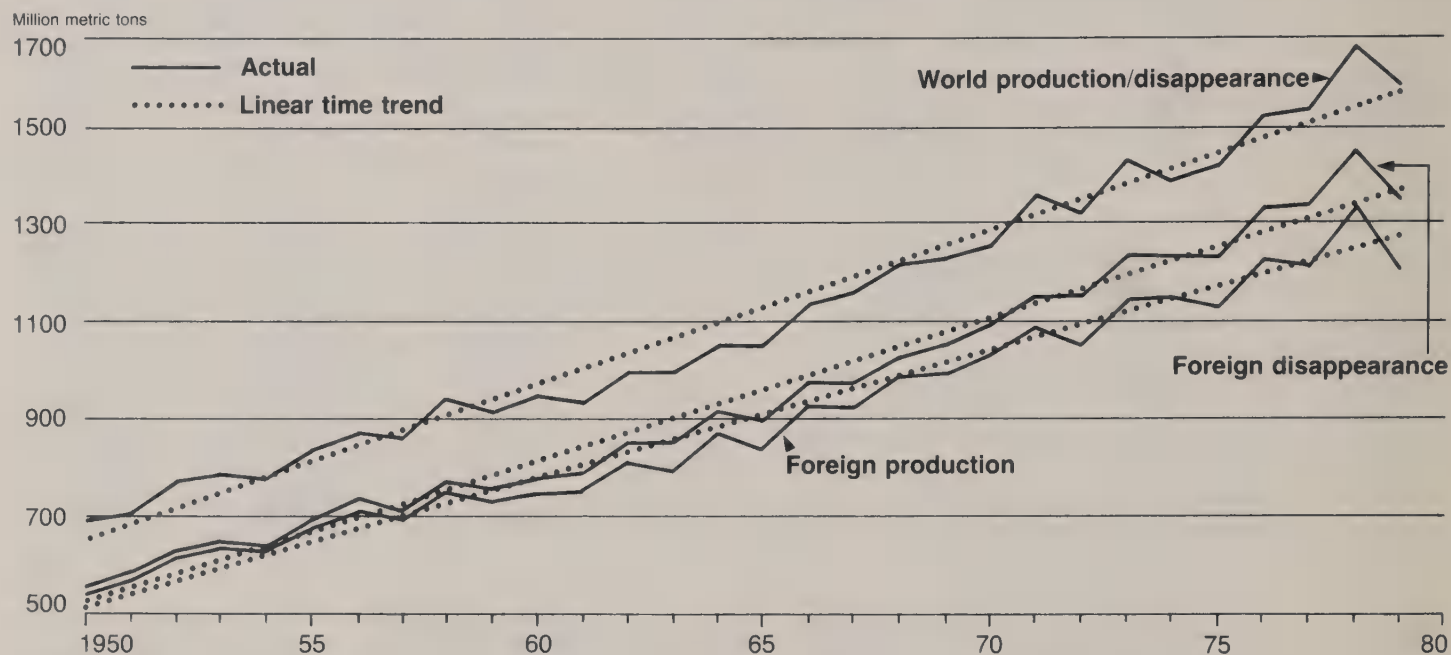
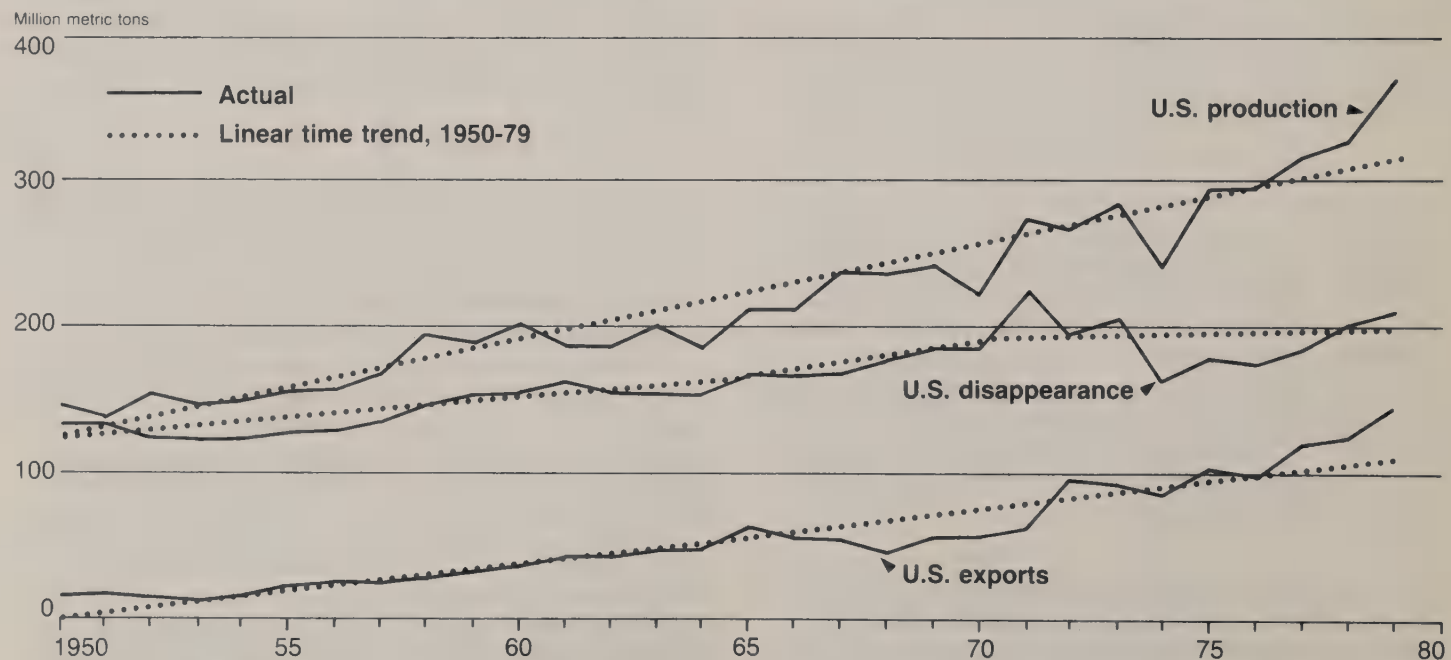


Figure 2

U.S. production, disappearance, and exports of grains and oilseeds



slowing of labor emigration, greater equality between farm and nonfarm income, the utilization of all readily available cropland, and continuing growth in demand for our products in foreign markets—strongly supports the assertion that the farm sector moved into basic equilibrium early in the decade.

Farm and food policy concerns shifted more slowly, but by the late seventies questions associated with tight supplies were successfully competing with more conventional questions of enhancing farm returns and managing excess capacity for the policymakers' attention.

The assessment of demand and supply prospects that follows suggests that foreign demand for U.S. products, the state of U.S. agriculture, and agricultural policy concerns of the early eighties will be more similar to those of the turbulent middle and late seventies than to the previous 25 years.

Foreign Demand Trends and Prospects

Analysts studying foreign agricultural demand trends and prospects are in general agreement that the basic factors at play over the last 30 years will continue to shape developments in the first half of the eighties.

Demographics, economics, and politics combined over most of the last three decades to expand foreign demand for agricultural products at a 2.8-percent per year pace, more than double the rate of the first half of the century. Foreign population increased by 75 percent in the last three decades; this unprecedented growth in the number of people to be fed would have generated two-thirds of the period's increase in demand if growth in income had been distributed evenly enough to translate food needs into food demand. Growth in food needs outpaced growth in effective demand in much of the world, however, and population increases probably accounted for only about half of the period's increase in demand.

The period's remaining growth in demand was due to a variety of economic and policy factors. Economic growth worldwide was favorable enough to generate average annual real increases in per capita incomes of 3 percent and, in turn, increases in per capita demand of 1 percent or more each year. Increased affluence in the wealthiest countries also shifted the composition of demand toward fed livestock products. Demand for meat, milk, and eggs and for the feedstuffs used in their production grew at more than double the rate of growth in demand for more traditional foodstuffs. Although largely confined to 400 to 500 million of the world's most affluent people—less than 20 percent of the total population—this shift accounted for a disproportionately large share of total growth in world demand.

Also contributing to demand growth in the fifties and sixties were the low, generally declining commodity prices referred to above and increases in the international financial resources available to pay for food imports. Real food prices declined in 20 of the last 25 years while foreign exchange holdings in most countries in the world more than doubled. As the drastic 1972 increase in Soviet demand demonstrated, agricultural and trade policies also played a critical role.

Forecasters studying the eighties conclude that, despite slower population and economic growth, demand is likely to expand at a near record 2.5 to 2.7 percent annually and that increases in the volume of products demanded will be 25 to 50 percent greater than the increases of the seventies.

Demographers are in general agreement that the early eighties will be a period of gradually slowing population growth rates. The world birth rate, estimated at roughly 30 per 1,000 in 1979, is expected to drop toward 28 per 1,000 by the mid-eighties while the death rate is expected to drop from 12 per 1,000 to possibly 11 per 1,000. Implied in these changing birth and death rates is a drop in the population growth rate from 1.86 percent per year currently to 1.79 percent by the middle of the eighties (table 3). While precise forecasts of birth and death rates differ, demographers agree that little change in the more affluent countries' already low growth rates is likely and that the most pronounced changes in population growth will occur in the developing countries. Population growth rates in the most affluent developing countries should continue to decline and their annual gain in numbers of people should peak toward the end of the decade. Growth rates in the lowest income developing countries, accounting for nearly half of the world's population, are not expected to peak until the early nineties and their annual increase in numbers will continue at record levels through the end of the century. Underlying these forecasts is the assumption that governments will intervene through social programs to reduce crude birth rates well below the levels normally associated with the developing countries' income levels.

The implications of lower population growth rates for growth in agricultural demand over the next 5 years can be deceptive, however, unless changing per capita food needs and absolute increases in the numbers of people to be fed are considered. The drop in growth in population rates forecast between now and 1985 is simply too small relative to increasing per capita food needs to slow even the rate of growth in demand. Even should demographers prove correct and population growth rates slow in developing countries, the small increases in per capita caloric food requirements associated with the countries' changing age composition will keep demand growth rates record high until well into the nineties. A weighted sum of regional population growth rates and changing caloric food requirements suggests population-related

Table 3—World population, actual and projected

Region or country	Compound annual growth rates			Absolute population			Annual increase in people		
	1960-70	1970-80	1980-85	1970	1980	1985	1960-70	1970-80	1980-85
	<i>Percent</i>			<i>Millions</i>					
Developed	1.09	0.79	0.75	708.4	766.7	796	7.3	5.8	5.8
United States	1.26	.83	.95	204.9	222.6	233	2.4	1.8	2.1
Canada	1.75	1.37	1.30	21.3	24.4	26	.3	.3	.3
Western Europe	.80	.42	.35	334.3	348.7	355	2.6	1.4	1.2
South Africa	2.69	2.50	2.45	25.3	32.4	37	.6	.7	.8
Japan	1.03	1.16	.80	104.3	117.0	122	1.0	1.3	.9
Oceania	2.08	1.67	1.55	18.3	21.6	23	.3	.3	.3
Centrally planned	1.85	1.48	1.20	1,216.6	1,408.7	1,494	20.4	19.2	18.5
Eastern Europe	.74	.69	.65	125.5	134.5	139	.9	.9	.9
USSR	1.26	.93	.95	242.8	266.3	279	2.9	2.4	2.5
China	2.21	1.74	1.30	848.3	1,007.9	1,076	16.7	16.0	13.6
Developing	2.47	2.49	2.50	1,792.1	2,292.2	2,592	38.8	50.0	60.0
Latin America	2.75	2.84	2.90	282.9	374.3	432	6.7	9.1	11.5
North Africa/Middle East	2.64	2.74	2.70	186.6	244.5	279	4.3	5.8	7.0
Other developing									
Africa	2.44	2.63	2.65	239.3	310.2	354	5.2	7.1	8.7
Developing Asia	2.44	2.32	2.30	1,059.3	1,332.4	1,493	22.0	27.3	32.0
Rest of world	2.67	2.53	2.45	24.0	30.8	35	.6	.7	.8
World total	1.99	1.86	1.79	3,717.1	4,467.6	4,882	66.5	75.0	83.0

Sources: U.S. Bureau of the Census, United Nations, and selected country sources.

rates of growth in demand could average 0.2 to 0.3 percentage point higher than during the seventies. Moreover, implied in the lower 1.79-percent world rate is an annual increase in the number of people to be fed to over 83 million by 1985—an annual increase comparable in size and poverty to the population of Bangladesh—compared with a 75-million annual increase in the midseventies and a 66-million increase in the midsixties.

While their specific forecasts vary, macroeconomic forecasters agree that the economic outlook for the first half of the eighties will be less favorable than over most of the sixties and seventies. The early eighties are likely to be marked by a continued slowdown in world economic growth and serious, persistent problems of inflation and unemployment. Recovery starting in late 1981 is likely to be more prolonged than in past cycles and growth from 1983 through 1985 is not expected to bounce back to the highs reported following earlier recoveries (table 4).

As is the case with population growth, however, the pattern of changes in economic activity across countries and the absolute levels of income forecast for much of the world should

minimize the negative impact of generally poorer growth prospects on demand for agricultural products. Economic prospects and their implications for the agricultural sector are best seen on a regional basis. The bearish economic outlook described above depends in large part on prospects for the 15 to 20 most developed countries that dominate the world economy while the food demand prognosis depends largely on economic growth outside these countries. Underlying this prognosis is the expectation that income-related shifts in diets toward more livestock products will continue, possibly accelerate, in the middle-income countries with favorable economic prospects and more than offset poor demand prospects elsewhere.

While the developed countries' economic prospects vary widely, they are without exception substantially worse than for most of the sixties and seventies. The early eighties is expected to be a period of growth slowdown in leading countries—West Germany and Japan—and recession in the United Kingdom, the United States, and Canada. Inflation rates in the seriously affected countries such as the United States and Canada are expected to be nearly double the rates of the seventies; even traditionally low inflation countries are

Table 4—World per capita income data, actual and forecast

Country or region	Compound annual growth rates			1978 per capita income
	1960-70	1970-80	1980-85	
	----- Percent -----			U.S. dollars
Developed:				
United States	2.8	2.0	1.8	9,700
Canada	3.4	2.8	2.3	9,200
Western Europe	4.2	2.6	2.2	5,900
South Africa	3.2	.6	.4	1,500
Japan	9.1	3.5	3.3	7,300
Oceania	3.2	1.4	1.4	7,350
Centrally planned:				
Eastern Europe	3.8	4.2	3.2	3,250
USSR	3.5	3.0	2.5	3,700
China	5.2	3.8	3.4	460
Developing:				
Latin America	3.2	3.1	2.8	1,190
North Africa/Middle East	N.A.	4.4	3.8	1,250
Other developing Africa	N.A.	1.6	1.3	360
Developing Asia	2.3	2.1	1.9	290

N.A. = Not available.

Sources: Organization for Economic Cooperation and Development, Project Link, and World Bank.

expected to face rates 1 to 3 percentage points higher than in the sixties and seventies. Unemployment rates are likely to follow the same pattern with substantially higher rates than in the sixties and seventies; the traditionally full-employment economies are expected to face unemployment rates several percentage points higher than in the sixties and seventies.

Forecasters are in general agreement as to the proximate causes of this dim outlook for the early eighties. Several key economies were seriously overheated in much of late 1979 and 1980, but virtually all faced the combination of worsening unemployment and inflation. Most are still faced with choosing between easing unemployment or inflation—in either case at the expense of real growth. The closer synchronization of the developed countries' business cycles and the strong trade linkages tying their economies together have tended to worsen the situation by magnifying past upturns and, more important, the current downturn.

It is several longer term problems, however, that have led many forecasters to expect dampened longer term economic growth, inflation, and unemployment rates. Among these longer term questions are the problem of making the transition to alternative higher cost energy sources, the problem of short supplies and higher prices for other key inputs, and the problem of lagging productivity growth—particularly labor

and capital productivity. Also critical in the longer term are problems of declining savings rates and what appear to be widespread built-in inflationary expectations. Contributing to these largely macroeconomic problems are broader international problems such as uncertain trade, exchange, and finance regimes.

Uncertainties in these longer term areas tend to bias most forecasters' expectations downward. Forecasters agree that even the dampened prospects noted above depend on a calm oil market—a market characterized, if not by price stability, at least by supply stability. Another critical area is uncertainty regarding wage inflation; macroeconomic forecasters agree that even moderate gains in economic growth and any slowdown in inflation and unemployment will depend on tying future wage growth to productivity gains.

The impact of these economic uncertainties on the developed countries' agriculture is likely to be mixed. Poorer economic prospects will tend to dampen growth in demand for agricultural products and further weaken many of the industrialized countries' comparative advantage in agricultural production. A number of factors suggests the effect on food demand will be small. The level of income common in many of the developed countries is high enough to weaken the link between economic performance and agricultural demand. Growth

prospects in the lower income developed countries with appreciably higher income elasticities of demand are bullish enough—particularly toward the end of the period—to accelerate the shift toward more livestock products in their diets and to generate sharply stronger growth in demand for feedstuffs.

The uncertainties described above—particularly uncertainties regarding alternative energy sources—raise the prospect of stronger growth in alternative sources of demand for agricultural products. While the actual volume of agricultural products demanded for energy conversion and expanded industrial uses is not—with a few marked exceptions—likely to be large by 1985, stronger growth in such unconventional sources of demand would tend to offset any slowing of growth in traditional areas. Uncertainties regarding energy costs also raise the prospect of further shifts in the developed countries' comparative advantage, or disadvantage, in food production. The energy intensity of production and the limited alternative production techniques available in many developed countries suggest slower growth in supply and, given the demand prospects noted above, faster growth in import demand. This problem would be particularly acute in Japan and much of Western Europe. Hence, on balance, poorer economic prospects in the developed countries should depress growth in agricultural supply, slow growth in agricultural demand marginally, and encourage growth in import demand.

Economic activity in the developing countries is likely to follow the same general pattern but with several important exceptions and less homogeneity across countries. The oil importing developing countries as a group face a pronounced slowdown in economic growth and increases in inflation and unemployment. Slowdown is likely to be particularly severe in South Asia and sub-Saharan Africa where the early eighties will generally be a period of economic stagnation. The proximate causes of the oil importing developing countries' bleak outlook vary widely but virtually all face rapidly rising oil import bills. With many of the developing countries' key development sectors energy intensive and oil dependent, switching to alternative energy sources will be particularly difficult. In many cases, less energy-intensive development will mean slower development in the eighties.

Exacerbating the economic outlook for the oil importing developing countries are the added problems of deteriorating prospects for trade, private capital flows, and development assistance from the developed countries. Slower growth in trade with the developed countries—which account for over two-thirds of the developing countries' exports—is likely to slow economic growth to less than three-fifths the pace of the seventies. Many countries could find it difficult to maintain, let alone expand, trade as recession in the developed countries weakens demand for primary products and

strengthens protectionism in the light manufactures sector. Further worsening many developing countries' trade prospects are broader, systemic problems such as international inflation and currency instability.

The majority of the oil importing countries also face increasingly severe problems of finding capital to finance large import bills and to fund ongoing development projects. While their external capital needs are likely to increase at a record rate in the early eighties due to general development needs, higher oil import bills, lower export earnings, and mounting debt servicing obligations, their external capital flows are likely to become increasingly costly and difficult to arrange. Private capital flows, a major source of funds in the seventies, are likely to slow as even the middle-income countries become risky debtors. Concessional flows have slowed in nominal terms and dropped off significantly in real terms as many donor countries cut budget allocations in austerity moves. This slowdown in concessional flows will be particularly hard on the lowest income countries with little or no alternative sources of funding.

Economic prospects for oil exporting developing countries and selected other developing countries are considerably brighter than for the majority described above. Among the established oil exporting countries, growth is likely to average only marginally below the record rates of the late seventies. Problems of recycling petrodollars, investing in developing the non-oil sectors of their economies, and overcoming serious inflation problems will tend to slow growth somewhat. Prospects are brightest for the emerging oil exporters such as Mexico, where growth could average 50 to 100 percent above the rates of the late seventies. A select group of relatively affluent oil importing developing countries—Korea, Taiwan, Malaysia, and Ghana—are also likely to share in the oil exporters' prosperity. Underlying their bright prospects are resource monopolies or near-monopolies similar to OPEC's (Organization of Petroleum Exporting Countries) or sufficient growth momentum and economic diversification to overcome the impact of high oil prices and poor trade prospects.

These two widely different outlooks are likely to keep growth in developing countries' food demand close to the rate and comparable to the pattern of the sixties and seventies. Demand growth in the lowest income developing countries will continue to lag at roughly the rate of growth in indigenous production; poor economic prospects will continue to rule out all but the most critical food imports. The outlook is poorest for countries in sub-Saharan Africa and parts of South Asia where there is little prospect for increasing production at population growth rates.

More than offsetting the lowest income countries' poor prospects, however, are favorable prospects for record growth in food, feed, and fiber demand in the oil exporting and

selected high-growth developing countries. Combined quantitative and qualitative improvements in diets in these middle-income countries could generate increases in demand similar in magnitude and impact on the world market to the dietary shifts in the most affluent countries during the fifties and sixties. Rising incomes in these 15 to 20 countries with a combined population of over 600 million will tend to increase the quantity of food demanded and change the mix of products consumed markedly. More food—albeit traditional foods such as grains, starches, and pulses—will be demanded by lower income groups who make up half the population of these so-called middle-income countries. Increasing affluence in the wealthier half of these countries' populations will also generate demand for more livestock products and—given their limited livestock production alternatives—exponential growth in demand for grain and oilmeal for feed.

Foreign Supply Trends and Prospects

A number of different factors combined over the postwar period to expand foreign agricultural production at a 2.8-percent per year rate, more than twice the pace of the first half of the century. Chief among these factors were growth in the resources allocated to food production, productivity

gains, and what appears in retrospect to have been unusually favorable weather. Contrary to the demand picture outlined above, however, the rate and pattern of growth in supply in the eighties are likely to differ markedly from the sixties and seventies.

For the postwar period as a whole, over one-third of the gain in world food production was due to expansion in the resources—particularly arable area—committed to production. Expansion was most pronounced in the fifties and sixties as new lands were opened up, and again in the middle seventies as the United States returned large acreage reserves to cultivation (table 5).

The remaining two-thirds of the world's postwar gains were the result of productivity gains due largely to improved farming practices, wider use of yield enhancing inputs such as fertilizer, and adoption of higher yielding plant varieties. Fueling this growth in productivity were a number of critical technological advances that raised returns on improved farm management while expanding the supply of low-priced fertilizers and related inputs. As with area expansion, the strongest productivity gains were noted in the fifties and sixties. While the wide weather fluctuations of the seventies make it difficult to assess recent yield gains, pro-

Table 5—Growth in agricultural production

Region or country	Compound annual growth rates					
	Production		Arable area		Productivity	
	1950-80	1972-80	1950-80	1972-80	1950-80	1972-80
	<i>Percent</i>					
Developed:						
United States	2.1	2.8	0	1.3	2.1	1.5
Other major exporters	2.2	1.9	1.5	.5	.7	1.4
Western Europe	2.3	1.7	0	-.3	2.3	1.9
Japan	1.9	1.1	-.1	-1.4	2.0	2.5
Centrally planned:						
Eastern Europe	2.8	2.6	-.6	-.2	3.3	2.7
USSR	3.4	1.6	.2	0	3.1	1.6
China	2.5	2.3	.1	.2	2.4	2.1
Developing:						
Latin America	3.1	3.2	1.8	1.8	1.3	1.4
North Africa/Middle East	2.9	2.6	.6	.2	2.3	2.4
Other developing Africa	2.3	1.2	1.5	.5	.9	.7
South Asia	2.7	2.3	.7	.9	2.1	1.4
East Asia	3.9	4.0	.7	.9	3.3	3.0
Foreign, total	2.7	2.3	.6	.4	2.2	1.9
World, total	2.8	2.3	.7	.4	2.2	1.8

Sources: USDA *Index of World Agricultural Production* and FAO *Production Yearbook*, various issues, 1962-79.

ductivity growth over much of the seventies appears to have slowed, while year-to-year swings in productivity appear to have increased substantially.

The information available on the world's agricultural resource base and the productivity gains likely in the near term suggest growth in production in the early eighties is likely to slow to possibly 2.1 to 2.4 percent per year or three quarters of the postwar rate. Equally important, the sources of growth in production and the cost of production gains are also likely to change dramatically.

Production gains in the eighties due to relatively inexpensive expansion in arable areas are likely to be significantly smaller than for any other period over the last three decades. The inventory data shown in table 6 suggest that foreign growth in arable area in the early eighties will average less than 4 million hectares (1 hectare is about 2.5 acres) per year—less than half the average increase during the postwar period to date—despite what are likely to be improved economic incentives.

Many countries face absolute constraints or are nearing what must be considered absolute constraints over the next 5 years. As the few remaining reserves of readily available, relatively fertile land are depleted in these countries, expansion will have to move even further into fragile lands where the risk of soil erosion or other environmental damage is appreciably greater, where yields are substantially lower, and where the cost of production is significantly higher. Virtually all the relatively fertile cropland readily available in

the developed and centrally planned countries is already in use. Equally important, economic and environmental constraints are likely to limit the use of remaining resources, and many of the resources already committed to production, to levels far short of their physical maximum.

Expansion in the resources committed to agriculture in the developing countries is also likely to slow, particularly in land poor areas of Asia, North Africa, and the Middle East. Even in Latin America and Africa, the rate of resource expansion is likely to average less than half that of the increases of the sixties and seventies. Moreover, many cultivation techniques presently in use in developing countries—including overcropping and overgrazing, increased reliance on marginally productive and semi-arid lands, and poor management and conservation practices—will make it difficult to maintain the longer term productivity of the resources already in use.

Equally important, much of the expansion in area likely in the eighties will tend to exacerbate problems of interannual fluctuations in production. While less than 20 percent of the land under cultivation in the sixties was classified as semi-arid and rainfall-dependent, as much as 30 percent of the land under cultivation by 1985 will be semi-arid. This shift toward more marginal areas is likely to widen interannual swings in yield and production; favorable weather will generate good to excellent harvests but poor weather or even rainfall only slightly below normal will result in crop failure. As more of our resources are committed to use and the excess capacity readily available to offset shortfalls here or abroad dwindles,

Table 6—World arable area, actual and projected

Region or country	5-year averages				1985
	1951-55	1961-65	1971-75	1976-78	
Million hectares					
Developed	361.2	371.8	394.0	392.2	394.5
United States	188.5	180.5	189.3	188.0	191.0
Other major exporters	72.5	89.0	102.2	103.6	104.0
Western Europe	95.1	96.4	97.2	96.0	94.5
Japan	5.1	5.9	5.3	5.0	5.0
Centrally planned	384.3	394.5	386.2	385.1	386.5
Eastern Europe	55.0	56.0	46.5	46.2	45.5
USSR	219.8	229.5	232.4	232.4	232.0
China	109.5	109.0	107.3	106.5	109.0
Developing	529.2	607.1	656.7	680.0	698.5
Latin America	93.5	114.0	133.2	143.0	155.0
North Africa/Middle East	78.5	86.3	91.5	92.0	92.5
Other developing Africa	116.0	146.5	160.5	164.0	169.0
Developing Asia	241.2	260.3	271.5	281.0	284.0
World	1,274.7	1,373.4	1,436.9	1,457.3	1,479.5

Sources: Historical data from *FAO Production Yearbooks*, various issues, 1962-79; forecast data from selected country sources.

the market impact of these widening fluctuations will increase substantially and, contrary to past experience, could carry over for several seasons.

Increasingly tight resource constraints necessarily mean that future increases in food production will have to depend on accelerating growth in productivity. Such growth will depend in the short term of half a decade on accelerating adoption of existing technology and assuring farmers an expanding supply of attractively priced inputs. Although significant gains in productivity could accrue from improved production and management systems and wider use of available technology, sustaining, let alone increasing, the pace of productivity gains could be difficult in the early eighties. No significant technological breakthrough or speed-up in adoption of existing technology appears imminent. Moreover, the cost of productivity gains over the next 5 years is likely to increase significantly as energy based inputs—including fertilizers, pesticides, and fuels, as well as irrigation facilities and machinery—become more expensive.

The rising cost of inputs could strain many producers' ability to maintain, let alone raise, productivity in areas where use of inputs is already high. High input prices could also slow or stop productivity growth in low income areas

where the potential for input related increases in yields is quite high but where the resources necessary to finance their use simply may not be available.

Foreign Trade Trends and Prospects

Few countries in the world would have been able to support the dramatic gains in food and agricultural consumption of the last three decades through increases in indigenous production alone. World trade in agricultural products increased over twice the rate of growth in production and consumption. The value of world agricultural trade tripled in the two and one-half decades ending in the early seventies and doubled again from the early seventies to the end of the decade. The volume of world trade in grains rose by more than 7 percent per year, while trade in oilseeds and products increased by more than 9 percent per year. The United States was the single largest supplier of this expanding agricultural trade. The volume of U.S. grain and oilseed exports more than doubled in the seventies alone, while the total value of our agricultural exports increased sixfold (table 7).

Should the foreign supply and demand prospects outlined above materialize, the grain and oilseed production, consump-

Table 7—Growth in U.S. agricultural trade

Item	1950		1972		1980	
	Volume	Value	Volume	Value	Volume	Value
	<i>1,000 tons</i>	<i>Million dollars</i>	<i>1,000 tons</i>	<i>Million dollars</i>	<i>1,000 tons</i>	<i>Million dollars</i>
Export total	—	2,986	67,298	8,242	163,877	40,481
Grain and products	11,764	1,034	45,362	2,875	112,348	17,168
Oilseeds and products	1,019	168	15,931	2,137	35,590	9,811
Cotton	807	949	630	468	2,047	3,033
Animal and animal products	—	322	1,448	1,062	2,450	3,770
Fruits, nuts, and vegetables	1,179	181	2,272	758	3,748	3,041
Other	—	322	—	942	—	3,658
Compound annual growth rates						
	1950-80		1950-72		1972-80	
	Volume	Value	Volume	Value	Volume	Value
<i>Percent</i>						
Export total	—	9.0	—	7.0	11.8	22.0
Grain and products	7.8	9.7	9.4	7.1	12.0	25.0
Oilseeds and products	12.6	14.3	19.6	18.5	10.6	21.0
Cotton	3.1	3.9	-1.6	-4.6	15.9	26.3
Animal and animal products	—	8.7	—	8.3	6.8	17.2
Fruits, nuts, and vegetables	3.3	9.6	4.5	10.0	6.5	19.0
Other	—	8.2	—	7.4	—	18.5

— = Not applicable.

tion, and trade figures shown above will look somewhat different in 1985 (figs. 1 and 2). Imports of food, feed, and fiber will have to increase at or above the rate of the seventies to fill the widening gap between foreign production growing at 2.1 to 2.4 percent per year and foreign demand growing at 2.5 to 2.7 percent per year. By 1985, the world outside the United States will depend on imports from the United States for 15 percent of its agricultural supplies, compared with 2 percent in the early fifties and 11 percent in the late seventies. U.S. exports of agricultural products will have to expand by 5 to 8 percent per year.²

Commodity-specific foreign supply and demand forecasts suggests that this growth in demand for U.S. products will be strongest in feedstuffs, such as coarse grains and oilseeds, moving to the so-called middle-income countries—the lower income developed, selected centrally planned, and higher income developing countries. Prospects for expanding domestic feedstuffs production in most of these countries are limited due to resource constraints; the population and macroeconomic forces described above, however, should strengthen growth in demand in these 15 to 20 countries with a population of over 600 million and make any significant improvement in diets dependent on increased imports. These same countries are also in many cases likely to become major importers of vegetable oils and other processed agricultural products produced in only limited quantities domestically.

Import demand for feedstuffs is also likely to continue strong in many countries that are already major established markets. The high-income countries of Western Europe and Japan will continue to be the world's largest food and feed importers. Even should growth in demand slow as many of the developed countries face slowed economic growth, they will continue to depend on imports for one-third to one-fourth of their agricultural supplies.

Though food needs are likely to continue to grow at record rates in the very poorest countries, their commercial trade is likely to be limited to purchases of the most basic food grains in years of pronounced production shortfalls. Even these limited purchases, however, are likely to increase as production constraints and population growth force developing country governments to reassess their foreign exchange spending plans and to pressure the developed countries—particularly the United States—for more food aid. The food aid implica-

² The U.S. export forecasts cited through the rest of this paper were calculated on the basis of supply and demand estimates for wheat, feed grains, rice, oilseeds, cotton, livestock, and tobacco for the 28 major regions of the world. Demand forecasts were based on population and income growth rates, expectations about changes in taste, and livestock-feed conversion rates. Supply forecasts were based on area and productivity trends and a review of land constraints and input supplies and prices that could affect growth in productivity. Demand for U.S. exports was calculated as the difference between foreign supply and demand.

tions of the strengthening commercial import demand likely in the eighties, however, suggest a widening margin between food aid needs and availabilities. The opportunity cost of food donations is likely to increase significantly in a bullish world commodity market while the developing countries' aid needs—both to cover shortfall or disaster related emergency needs and to ease their chronic imbalance between food supplies and basic human needs—are also likely to increase substantially.

The United States faces not only general expansion in world grain and oilseed import demand but—particularly toward the end of the period and in products such as coarse grains—capacity limitations in the other exporting countries. By the mideighties, the United States could be exporting over 175 million tons of grains and oilseeds—compared with 80 million tons in the early seventies—to supply a larger share of a substantially larger world market (table 8).

Prospects for trade in selected other commodities such as cotton and tobacco stand in marked contrast to grain and oilseed prospects. The supply and demand factors outlined above suggest that world cotton trade is not likely to expand significantly because production and consumption will grow at roughly the same pace. The impact of rising prices for petroleum-based synthetics should work to make cotton more competitive and bolster lagging growth in demand to approximately the 2-percent supply growth likely in the early eighties. The United States is likely to continue to be the world's leading cotton exporter with exports averaging nearly 7 million bales—well below recent highs but above the average for the last two decades. Trade in tobacco is likely to decline, due both to sluggish growth in demand relative to supply overseas and to the re-emergence of strong competing exporters in areas of Africa. Growth in import demand for

Table 8—U.S. agricultural exports for selected commodities, actual and projected

Years	Wheat	Rice	Feed grains	Soybeans ¹	Cotton
	----- Million metric tons -----				Million bales
1977/78	30.5	2.1	56.3	26.0	5.5
1978/79	32.5	2.4	60.2	27.7	6.2
1979/80	37.4	2.7	71.4	31.3	9.2
1980/81	41.5	3.2	74.3	29.4	5.7
1981/82	43.0	3.1	76.5	30.7	7.1
1982/83	44.0	3.2	79.0	32.7	6.8
1983/84	45.0	3.3	82.0	33.4	6.8
1984/85	46.0	3.5	86.0	34.0	6.8
1985/86	46.0	3.6	90.0	34.7	6.7

¹ Soybeans and soybean meal shown in soybean equivalent.

other items such as livestock and livestock products, and other specialty products that account for a small share of U.S. trade volume but a significant share of U.S. trade value should be strong enough to keep total export demand growing 5 to 8 percent.

Many of the factors underlying this strong growth in trade in the early eighties suggest that demand for U.S. products abroad will also become significantly more variable from year to year. Interannual fluctuations in foreign demand for U.S. products widened significantly in the eighties; variability in trade for wheat, coarse grain, rice, and oilseed tripled over the last decade and a half (table 9). Fluctuations in foreign demand for U.S. products are likely to continue to widen in the eighties. As producers abroad expand to more marginal areas subject to wider weather related fluctuations in production and as more countries isolate their domestic markets from equilibrating price and quantity adjustments in the world market, the magnitude and frequency of fluctuations in foreign demand are likely to widen even further. The increasingly dominant role of the United States as residual world supplier will tend to translate year-to-year swings in production and consumption virtually anywhere in the world into fluctuations in demand for U.S. products. These two factors combined could result in another doubling of vari-

ability in the eighties and generate interannual swings in foreign demand for U.S. grains and oilseeds of 30 million metric tons.

Implications for U.S. Agriculture

The foreign supply and demand factors outlined above suggest that the eighties will be a decade of serious global adjustments—to record or near record growth in demand, to slower growth in production, and to increased dependence on the United States as a source of supply. Implied in these adjustments is the gradual reversal of several of the most pronounced trends of the last three decades—most notably, trend declines in real prices for food and agricultural products and the tendency to accumulate large commodity surpluses. In this sense, the eighties will be more similar to the turbulent middle and late seventies than to the relatively stable fifties, sixties, and early seventies.

The implications of these global adjustments for U.S. agriculture and the focus of our agricultural policy are no less serious. If U.S. production expands fast enough to meet expected growth in export demand and the increases in domestic demand, our agricultural plant will have to run far closer to capacity than at any other time in the postwar period.

Table 9—Annual variability in foreign demand for U.S. products¹

Period	Wheat	Coarse grains	Rice	Soybeans	Soybean meal	Total
<i>1,000 metric tons</i>						
1950-64	2,920	1,880	170	260	290	5,520
1951-65	2,800	2,125	170	300	380	5,805
1952-66	2,275	1,950	190	300	390	5,105
1953-67	2,450	1,950	175	290	390	5,255
1954-68	3,325	2,800	142	270	370	6,907
1955-69	3,475	3,000	140	885	380	6,880
1956-70	3,300	3,250	190	990	385	8,115
1957-71	3,450	3,125	185	950	340	8,050
1958-72	4,085	4,725	195	960	310	10,275
1959-73	4,730	5,555	215	1,010	305	11,815
1960-74	4,725	5,590	205	1,165	405	12,090
1961-75	4,900	6,605	215	1,160	420	13,300
1962-76	4,875	6,830	200	1,200	490	13,595
1963-77	4,925	7,075	195	1,310	475	13,980
1964-78	5,125	7,290	220	1,495	490	14,620
1965-79	5,350	7,425	230	1,715	540	15,260
1966-80	5,475	7,650	245	1,925	595	15,890

¹ Estimates of variability based on time series regressions analyses; variability measured as the standard error of the regression for successive best-fit 15-year linear and curvilinear time trends.

Significantly more of our agricultural and nonagricultural resources will have to be used, and used more intensively, to produce food. For at least the first half of the eighties, however, fluctuations in demand and supply are likely to be wide enough to shift us temporarily back toward excess supplies and surplus capacity or even further toward short supply and its attendant resource and inflation problems. Hence, the well-being of the agricultural sector and the economy in general will depend on the policymakers' capacity to address both the conventional farm and food issues of the fifties and sixties and the new, adjustment related issues of the late seventies.

U.S. Demand Trends and Prospects

While growth in foreign demand is likely to be the dominant determinant of the pressure put on our agricultural sector in the years ahead, growth in conventional and unconventional sources of domestic demand will also be critical. Many of the factors noted above as having shaped foreign food and agricultural demand over the last three decades were also at work in the United States and should continue in force in the eighties. Domestic demand for food and feed increased by roughly 1.7 percent annually over the last three decades. Less than two-thirds of this growth was generated by increases in population; increased affluence and abundant supplies of low-priced products generated a 0.4- to 0.5-percent annual increase in per capita demand and a dramatic acceleration in the shift in demand toward grain fed livestock products. This rate of growth was particularly impressive, given the already high per capita usage levels common two decades ago.

Forecasters speculating about prospects for the early eighties suggest population and income related growth in demand for agricultural products should slow to possibly three-fourths the rate of the last two decades. However, strong increases in less conventional sources for demand—including demand for biomass for energy conversion—could well push growth in total domestic demand for agricultural products to a near record 1.4 to 1.6 percent per year.

Growth in Conventional Sources of Demand. Much of the forecasters' expectations about slower growth in conventional source of growth in demand are based on indications that the United States is moving toward zero population growth in the nineties and that the economy will lag well into the mid-eighties. Should recent short-term demographic trends continue, population increases should average 0.9 percent per year through 1985.

More important, however, the macroeconomic outlook for the United States does not differ significantly from the bearish outlook described above for the other developed countries. Compared with the seventies, the first half of the

eighties is likely to be marked by lower real economic growth rates, continued high inflation and unemployment rates, and lower growth in real personal incomes (table 10). Real economic growth in the first half of the eighties is expected to average 2.5 to 2.8 percent per year, compared with over 3 percent in the seventies and 3 to 4 percent per year in the fifties and sixties. This slower rate of growth will be due largely to a combination of supply problems—such as shortages of basic input materials and rising input costs—and weaker productivity growth. Inflation in the early eighties—as measured by the implicit deflator for the gross national product—is expected to average over 8 percent per year, compared with 6 to 7 percent for the seventies and 3 to 5 percent in the previous two decades. Much of the pressure on the underlying inflation rate expected in the early eighties will result from higher input prices and continued wage increases in excess of productivity growth. Also contributing are inflationary expectations built into consumer and business decisions and the restrictive monetary policies likely to be in effect through much of the period to keep inflation from accelerating even further.

While unemployment averaged roughly 5.0 percent over the seventies, unemployment in the early eighties is likely to average over 7.0 percent; the notion of full employment could well be raised from 4.0 percent to 5.5 or 6 percent unemployment. Contributing to this growth in unemployment will be entry of a large number of inexperienced, unskilled teenagers into the work force and the overall lower levels of economic activity. As a net result, growth in real disposable personal income is likely to slow from the 2.5-percent per year rate of the seventies to less than 2 percent in the early eighties. Moreover, inflation will continue to move people into higher income tax brackets, further reducing disposable income. The resultant sluggish growth in consumer demand will contribute to the economy's overall poor performance by causing circular weakness in final goods demand. Corporate profits and other business incomes are expected to follow the same sluggish growth pattern.

Macroeconomic forecasters agree that this is not a permanent condition; prospects for the middle eighties improve significantly as labor demographics and the expectation of a more productive, energy efficient capital stock lend some optimism to the longer term outlook. There is underlying concern, however, that recovery from the 1980-82 slowdown will be longer than those following past slowdowns and that the United States will have to adjust to lower longer term equilibrium economic growth rates and higher inflation and unemployment rates.

The impact of this bearish macroeconomic outlook on demand for agricultural products is likely to be mixed. While slowed growth in real disposable incomes should hold down growth in demand, a number of factors will tend to keep any

Table 10—U.S. macroeconomic outlook

Item	Unit	1981	1982	1983	1984	1985
Gross National Product:						
Nominal	Bil. dol.	2,794.7	3,146.1	3,520.5	3,910.4	4,334.1
Real	1972 bil. dol.	1,417.2	1,464.0	1,518.1	1,569.8	1,526.3
Change	Pct.	.4	3.3	3.6	3.4	3.5
Personnel consumption expenditures	1972 bil. dol.	915.0	935.9	966.0	996.3	1,031.5
Investment	Bil. dol.	188.3	207.9	235.6	241.3	256.1
Price indices:						
GNP implicit deflator	1972 dol.	197.2	214.9	231.9	249.1	266.5
Change	Pct.	9.2	9.0	7.9	7.4	7.0
Prime rate	Pct.	11.1	10.8	10.6	9.4	8.5
Disposable personal income per capita:						
Nominal	Dol.	8,656.5	9,569.8	10,555.5	11,568.8	12,586.8
Change	Pct.	8.3	10.5	10.3	9.6	8.8
Real	1972 dol.	4,381.8	4,469.4	4,572.2	4,677.4	4,775.6
Change	Pct.	−.6	2.0	2.3	2.3	2.1
Unemployment rate	Pct.	7.9	7.4	7.2	6.9	6.3
Total population	Mil. people	224.7	226.8	229.0	231.2	233.3

slowdown minimal. Growth in food consumption is likely to be maintained at least in part by the impact that faster rising prices for consumer durables and nonfood nondurables are likely to have on the proportion of income available for food purchases. Moreover, Government programs such as the unemployment compensation and food stamp programs should tend to offset some of the impact of slowed growth on groups with the highest income elasticities of demand for agricultural products and the bleakest economic outlook.

Hence, on balance, income-related growth in food demand could average between 0.3 and 0.4 percent per year in the early eighties, compared with about 0.4 to 0.5 percent in the seventies; combined population and income-related growth in demand could well average between 1.1 and 1.3 percent, compared with 1.2 percent in the seventies.

Growth in Unconventional Sources of Demand. Forecasters agree, however, that several of the macroeconomic developments noted above—particularly more limited supplies and rising prices for petroleum-based energy products—could generate strong enough growth in less conventional sources of demand for agricultural products to push total growth in the eighties to near the 1.4 to 1.6 percent rate of the sixties and seventies. Chief among these factors is demand for agricultural products for fuel and industrial uses. As real energy prices increase between 8 and 12 percent per year, biomass is

likely to become an increasingly attractive source for liquid energy production. The Federal and State subsidy programs could place most of this expanding interest in energy from agriculture in the early eighties on the production of ethanol for use in gasohol, with corn as the most widely used feedstock.

While these two forces—expanding demand for ethanol for gasohol and use of corn as feedstock—are likely to expand energy related demand at record rates, the absolute quantities involved in the early eighties are likely to be limited by ethanol production capacity, the economics of alcohol production, and Government policy incentives. In the near term of 2 to 3 years, ethanol production capacity will be the major determinant of growth in fuel demand for agricultural products. With plant construction averaging 1 to 2 years to complete, substantial increases in feedstock conversion capacity are not likely to occur before 1982/83 even if current Federal and State subsidy programs continue to make commercial alcohol production economically viable. Growth in demand in the short term, however, will also depend on the amount of idle or underutilized capacity that can be brought into use. By 1982/83, as much as 830 million gallons of ethanol production capacity could be available; by 1985/86, capacity could reach 1,800 million gallons. Given current corn-ethanol conversion rates, ethanol production could account for 7 to 9 million metric tons of corn by 1982/83 and 14 to 22 million metric tons by 1985/86 (table 11).

Table 11—Ethanol production capacity and demand for agricultural products for energy production

Item	Annual additions to capacity							Cumulative 1980/81-1985/86 total
	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	
Million gallons								
Ethanol production capacity:								
Conversion/diversion of exist- ing capacity	0	0	150	150	100	75	50	525
Changes in plant production and new entrants	70	110	105	250	250	250	250	1,285
Total capacity	70	110	255	400	350	325	300	1,810
Million metric tons								
Potential demand for agricul- tural products (corn equiva- lent)	0	1.5-2.0	3.5-4.5	7-9	10-13	12-18	14-22	48-68

These capacity estimates depend heavily on a number of technical uncertainties such as changes in the yield of distillates per unit of feedstock and efforts to update or refit idle capacity. There is also considerable uncertainty regarding the economics of ethanol production and, more generally, the economics of producing energy from biomass at prices low enough to compete with the price of petroleum-based fuels in the early eighties. Various studies on the feasibility of large-scale gasohol production in the early eighties conclude that, given the technology currently onstream, the costs of producing ethanol are such that gasohol will be more expensive than petroleum-based fuels unless byproduct prices increase substantially or the Government mounts a major subsidization scheme. Hence, fuel demand for corn could well fall short of the levels implied in the capacity data of table 11. However, should fuel use expand to generate feedstock demand of even 14 million tons of corn by 1985, the overall rate of growth in agricultural demand could average 1.4 to 1.6 percent per year or only marginally below the peak domestic demand growth rates of the sixties and well above the slower rate of the seventies.

U.S. Supply Trends and Prospects

The foreign and domestic factors noted above suggest that demand for U.S. agricultural products could grow as much as 2.8 to 3.0 percent per year and fluctuate as widely as 15 to 20 percent from year to year in the early eighties. Foreign and domestic demand for U.S. grains and oilseeds could increase from 370 million tons in the late seventies to 450 million tons in 1985, plus or minus 25 million to 30 million tons depending largely on weather abroad. Demand for all agricultural products will tend to increase at a somewhat slower pace of 2.7 to 2.9 percent due to slower growth

in cotton and possible demand declines in a few products such as tobacco.

Meeting growth in demand at this 2.8- to 3.0-percent rate would entail expanding U.S. production at roughly one and a half times the average of the postwar period to date. Production in the fifties and sixties expanded roughly 2 percent per year, due largely to yield increases as area was limited by Government programs. In the middle and late seventies, production increases averaged over 3 percent per year due both to continued yield increases, largely because of favorable weather, and to use of acreage previously held out of production. However, sustaining growth in production at 2.8 percent per year in the eighties, particularly from the record high levels reached in the late seventies, raises serious questions about our capacity to produce without using substantially more of our renewable and nonrenewable resources more intensively and without substantially higher returns to producers.

This pressure to use more resources is likely to be most apparent in demand for the land and water. Given the growth patterns of the last several decades, area harvested in the major crops would have to expand by 20 to 25 million acres by 1985 to more than 130 percent of the acreage used during the sixties (table 12). In addition to expanding cropped area, the demand pressure of the early eighties will intensify land use, generate changes in cropping patterns, and increase pressure on the forage base. Even if optimistic estimates of area expansion of 3 million to 4 million acres per year are realized, the productivity gains necessary to augment area increases will depend on using significantly more nonland resources as well. Raising and sustaining U.S. crop yields to the levels necessary, given the area expansion outlined above, to

Table 12—U.S. area, actual and projected

Period	Wheat and rice	Coarse grains	Oilseeds	Cotton	Tobacco	Subtotal	Total arable area	Subtotal as percent of total arable area
----- Million acres -----							Percent	
Average:								
1950-55	76.1	156.8	23.1	24.6	1.7	282.4	347.0	81
1955-60	57.9	162.0	29.3	15.9	1.2	266.2	328.0	81
1960-65	55.5	134.0	33.7	15.7	1.2	240.0	305.0	78
1965-70	50.9	121.2	44.1	11.3	.9	228.5	299.0	77
1970-75	59.6	124.4	52.3	12.9	.9	250.1	313.5	79
1975-80	76.3	126.9	62.7	12.5	1.0	279.4	338.5	82
1980-85	81.6	127.7	76.0	14.1	.9	300.2	348.0	86
1979	74.3	120.8	78.8	14.1	.8	288.8	340.0	85
1980	83.8	124.1	74.0	15.0	1.0	297.9	344.0	86
1981	79.0	126.0	74.4	14.3	1.0	294.7	347.0	85
1982	79.8	127.6	75.0	13.7	.9	297.0	350.0	85
1983	80.7	128.5	76.5	14.0	.9	300.6	350.0	86
1984	82.8	129.3	76.9	13.7	.9	303.6	350.0	87
1985	83.7	130.4	78.9	13.5	.9	307.4	350.0	88

expand output 2.8 to 3.0 percent per year would require growth in the use of fertilizers and pesticides and related high productivity inputs of roughly 4.5 to 5.5 percent per year, about 125 to 150 percent of the rate of the last two decades. The changing mix of inputs needed in the eighties will also tend to make agriculture more dependent on nonfarm inputs and nonrenewable resources compared with the farm input and agricultural resource growth of most of the postwar period (table 13).

The combined acreage and productivity gains needed to expand output by 3 percent per year in the late eighties are certainly within the agricultural sector's physical capacity. The 1977 National Resource Inventory identified an agricultural cropland base of roughly 460 million acres, roughly 360 million acres of which are currently harvested and 100 million of which are idle cropland or cropland pasture. Another 35 million acres were identified as high potential land while 95 million additional acres were identified as medium potential. The potential for productivity gains through greater use of farm inputs and improved management is also great enough to suggest, given the resource inventory data, a physical capacity well in excess of foreign and domestic demand through the end of the century.

Realizing Production Potential. While the resource use and productivity growth outlined above are clearly feasible, a number of recent developments both within and outside the agricultural sector suggest that environmental and economic constraints could well limit use of land and key yield augmenting inputs to levels short of the maximum measured in resource inventories and yield potential studies. The sus-

tained expansion in acreage, intensification of land use, and increased input use needed to expand production by 3 percent per year are likely to make the environmental cost of any sharp expansion in output while protecting agriculture's productivity base high.

Table 13—Farm use for selected inputs, actual and forecast

Year	Use of selected inputs ¹	Year	Use of selected inputs ¹
	1960 = 100		1960 = 100
1960	100	1975	140
1961	99	1976	144
1962	102	1977	151
1963	105	1978	151
1964	107	1979	
1965	109	1980	154
1966	111	1981	159
1967	119	1982	165
1968	124	1983	171
1969	123	1984	178
1970	123	1985	185
1971	127		
1972	125		
1973	120		
1974	133		

¹ Includes fertilizers, pesticides, purchased seeds, petroleum fuels and oil, machinery, machinery repairs, irrigation charges, veterinary service, and medicine.

Equally important, the economics of production will have to be significantly more favorable, both for the long run and short run, before most farmers will make the sizable investments necessary to realize a large portion of the capacity potential implied in resource inventory and yield potential studies. Any major expansion in capacity will depend on large injections of farm and nonfarm inputs, such as labor and capital in demand elsewhere in the economy.

Further confounding this issue will be the impact of the bearish macroeconomic outlook described above on production costs and producer incentives even in the absence of pressure to expand output. Growth in output in the agricultural sector in the early eighties is likely to be slowed by the same basic problems of higher prices for and possibly short supplies of key inputs noted above for the general economy. Increases in the cost of at least three crucial inputs—energy, energy related inputs such as fertilizer, and credit—are likely to keep pace with the overall rate of inflation and push the cost of producing even the current volume of food and feedstuffs up 7 to 9 percent per year. Agriculture also faces the likelihood of a slowdown in productivity gains in the early eighties that will further exacerbate the cost problem. The marked, at least partially weather related, productivity gains of the last 3 years tended to disguise much of the period's rise in input costs; more normal weather in the early eighties could reduce crop yields or at least retard growth. These factors suggest that the early eighties, contrary to most of the postwar period to date, could well be a period of sharply rising nominal, and possibly real, costs of production even without strong pressure to expand input usage and increase the resources committed to agricultural production.

These prospects all tend to support the increasingly common notion that U.S. agriculture is reaching a critical longrun turning point at which supply becomes inelastic—or at least significantly less elastic—because quality land, inputs, and management are at such limits that additional output comes only at substantial cost increases. For short periods of a year or two during the last decade, weather fluctuations or policy decisions abroad caused temporary drawdowns in world food reserves and high prices symptomatic of capacity shortages. But in general, the last three decades were marked by a tendency toward overproduction. Excess capacity in the United States—measured as the total additions to stocks over and above reserve needs, land withdrawals, and subsidized exports other than emergency food aid relief as a percent of potential production—reached 10 percent in 1959. By the late seventies U.S. excess capacity had dwindled to the point that balancing domestic and foreign demand depended at least temporarily on annual increases in area, productivity gains, and favorable weather (table 14).

Should this prognosis prove correct, the early eighties will bring two fundamental changes in the U.S. agriculture. First, annual increases in foreign and domestic demand due to population and income growth will be greater, on average, than the increases in productive capacity due to resource expansion and productivity gains. The real prices received by farmers—given normal weather—should increase; scenarios generated using several longrun equilibrium simulation models suggest real price increases of 1 to 3 percent per year, compared with declines averaging 1 to 2 percent per year for the postwar period to date. Moreover, if the gains in capacity in the early eighties due to productivity and resource growth are more than offset by the losses in capacity resulting from unit cost increases and increasingly stringent environmental constraints, the real prices associated with the output needed to balance foreign and domestic demand could be substantially higher.

Second, the large price stabilizing stocks and land reserves of the fifties and sixties will be conspicuously absent in the early eighties. While this will tend to make American agriculture more manageable in that supply and demand will be closer in balance, the absence of land and stock reserves will make potentially large and unpredictable weather and policy induced swings in demand for U.S. agricultural products the major determinant of the state of U.S. agriculture. Translating the trade variability measures shown in table 9 into acreage equivalents suggests interannual fluctuations could raise or lower acreage demand 10 million acres from year to

Table 14—Excess production capacity¹

Period	Excess capacity	Period	Excess capacity
	<i>Percent</i>		<i>Percent</i>
1955-60	8.2	1975	0.6
1960-65	7.5	1976	.9
1965-70	4.8	1977	1.6
1970-75	3.6	1978	6.5
		1979	.8
1970	7.3		
1971	4.0	1980	-.1
1972	6.3	1981	0
1973	1.6	1982	0
1974	-1.2	1983	0
		1984	-.1
		1985	-.1

Note: Excess capacity calculated as total of stock buildup, land diversions, and subsidized exports, adjusted for emergency relief, as share of total agricultural production. Negative numbers denote drawdown in stocks.

¹ Data for 1981-85 are projected.

year. Interannual fluctuations of this magnitude could further confound the issue by shifting the supply/demand balance temporarily toward the prices associated with excess capacity or even further toward tight supplies.

Marketing Capacity Constraints. The implications of the substantially larger volume of production likely in the eighties for the agricultural marketing system—its major transportation, storage, and export components—are equally disconcerting. Given changing patterns of domestic use and increased proportion of production moving into exports, a 2.8- to 3.0-percent annual increase in production will generate a 3.5- to 4.0-percent increase in agricultural marketings. By the mid-eighties, the volume of products moving through the marketing system could be as high as 775 million tons, compared with an average of 450 million tons in the sixties and 560 million tons in the seventies.

Marketing quantities of this magnitude, while meeting the marketing needs of the rest of the economy, will entail expanding the capacity of the agricultural transportation system significantly and keeping utilization rates high. While the system's throughput increased by more than a third over the seventies from roughly 1.8 billion to 2.4 billion ton-miles, much of this growth was based on more intensive use of existing capacity rather than system expansion. The railroad system's capacity—a key mode of inexpensive bulk agricultural transportation accounting for over a quarter of total volume—actually declined. Bankruptcies, mergers, consolidations, and a number of related problems combined to reduce first class track mileage to 190,000 miles at the end of the seventies, compared with over 220,000 miles in 1950.

The 100 million to 150 million ton-mile annual increases needed to raise throughput to the 3.2 billion ton-miles likely to be needed by 1985 will depend on expanding the transportation system's overall capacity as well as on maintaining system use at close to full capacity. Moreover, given the changing economics and logistics of agricultural transportation, a disproportionately large share of the increase in transportation capacity, for at least the first half of the decade, will have to be in railroads. Alternative transportation modes—such as barge and truck transport—are not likely to expand fast enough to maintain their share of total traffic. Growth in barge traffic, which accounts for 25 percent of the total volume of goods moved, is likely to fall off substantially due to constraints on inland water systems. The limited capacity of existing lock and dam systems—particularly key facilities such as lock and dam 26 at the confluence of the Mississippi and Illinois rivers—will limit the volume that can be moved, increase the cost of shipping by barge, and reduce capacity utilization rates by adding to transport time. Increases in truck transportation—which accounts for over half of the total volume of agricultural products moved—are

also likely to slow in the eighties as fuel costs increase and as the current surplus of trucks disappears.

The problems associated with expanding rail transport at the rate needed to keep up with total demand and compensate for slowed growth in barge and truck transport are serious. Over most of the seventies, the rail system had considerable difficulty meeting the demands of its traditional shippers. The volume of agricultural products transported by rail actually stagnated at 130 to 140 million tons. In many areas, rail service declined, lines were abandoned or poorly maintained, and frequency of service was reduced; there have also been more general problems such as reliability and railcar shortages during critical harvest periods. Regulation, direct and indirect subsidies to competing modes, and the costly duplication of tracks and services resulting from previous overbuilding are cited by railroad management as reasons for the rail system's generally poor performance.

Prospects for expanding and upgrading railroad transport in the eighties will depend on improved railroad management as well as on modernization of rolling stock. Improved management might well entail further abandonment followed by a reorganization of the system to improve the quality of service, expand services in areas now poorly served, and possibly lower the net cost of transportation. Railroad operators also contend that deregulation of railroad rates is crucial both to encourage capital investments and to allow railroads to compete with other modes of transportation.

Although a major system overhaul may revitalize railroads and expand transportation capacity sufficiently to move the larger marketings likely in the early eighties, many areas of the country outside key farm areas will continue to face transportation problems. The availability of transportation could well become a significant determinant of both the cost and the geographic concentration of production in the eighties.

The increased volume of products to be handled in the eighties is also likely to tax the storage component of the marketing system. Increased pressure on the storage system will relate not only to the 3.5- to 4.0-percent annual increases in the volume of agricultural products produced but to increases in transportation related and reserve related demand for storage as well. As the eighties progress, strategically located storage capacity will be in greater demand to relieve pressure on an already strained transportation system during critical harvest periods. Demand for storage is also likely to increase as the agricultural plant is used at full capacity and as resource adjustments are replaced by reserve adjustments as the major market stabilization mechanism. These factors suggest expansion in storage needs from roughly 450 million tons in the late seventies to 550 million tons by 1985.

Prospects for expanding the storage system by 15 to 20 million tons per year will depend in large part on the provisions built into the new farm legislation. The information available suggests that storage capacity expanded over the last half of the seventies by more than 20 million tons per year—largely in response to the reserve provisions of the 1977 Food and Agriculture Act. Storage capacity utilization, on the other hand, averaged 70 to 75 percent in the late seventies, compared with 50 to 60 percent earlier in the decade and the unusually high rate of 75 to 85 percent in the late fifties and early sixties. Meeting the storage needs of the eighties will depend as much on system expansion as on better storage planning and location to encourage fuller capacity utilization.

Rapid growth in export demand will also place pressure on the specialized transportation and storage facilities used to move goods into export markets. The supply/demand balance noted above suggests exports of bulk-loaded grains and oilseeds could reach 170 to 180 million tons by 1985 compared with 120 to 140 million tons in the late seventies and less than 60 million tons in the late sixties (table 9). Current U.S. export capacity, based on loading information for peak shipping periods, is roughly 150 to 160 million tons, up more than a third from a decade ago. Given capacity utilization at even the unusually high rates of the late seventies, export capacity will have to expand 10 percent per year to meet the needs of the first half of the eighties.

Implications for the Policy Agenda for the Eighties

The supply, demand, and trade prospects outlined above suggest that U.S. agriculture will face a markedly different setting in the eighties. Foreign and domestic demand for our agricultural products is likely to be stronger than ever before. More of our natural resources will have to be used more intensively; demand for production inputs will continue strong. Our marketing system—its storage, transportation, and export facilities—will be severely taxed. Widening annual fluctuations in supply and demand here and abroad will still be able, however, to swing the short-term situation temporarily back toward excess capacity or further toward tight supplies. Hence, the food and agricultural policies for at least the early eighties will have to address a far wider range of domestic and foreign issues than previous policies. Several of these key domestic and foreign policy issues are outlined below.

Domestic Policies and Programs for the Eighties

The global environment described above suggests that the domestic agricultural policies of the eighties will have to address the key problems of capacity management, market

stabilization, and resource and productivity development. The first problem centers on managing agriculture's productive capacity so as to keep supply and demand in balance in temporary periods of production windfalls or weak demand. It will also include, however, managing capacity so as to minimize the social, economic, and environmental cost of using more of our resources more intensively to produce food in increasingly frequent periods of tight supply. The market stabilization problem centers on minimizing the economy wide disruptions associated with widening year-to-year fluctuations in foreign and domestic supply and demand. Policymakers also face the challenge of developing longer term programs aimed at improving resource management and encouraging productivity growth.

Capacity Management and Market Stabilization. While the commodity, income, and credit programs adopted to meet the farm sector's growing capacity management and market stabilization needs may not differ substantially from many of the programs of the last decade, their focus will have to shift markedly. Among the most pronounced changes in emphasis will be a shift from enhancing farm incomes toward stabilizing returns to farm factors, and from commodity-specific supply management to sector wide capacity management and development. Also likely is a further shift toward concern with agriculture's interrelationship with the rest of the economy in areas such as risk sharing, demand for resources, and inflation.

Given the political setting of the early eighties, these shifts in focus are likely to be embodied in modifications of the basic programs provided for in the Food and Agriculture Act of 1977. The grain programs provided for in the 1977 Act, for instance, can serve as a basis for designing commodity programs for the early eighties. The grain programs provided for in the 1977 Act provide for a substantially larger market role in the supply/demand management than previous acts. Within the bounds of commodity loan rates and reserve release and call prices, market forces manage the sector. The act also provides, however, for Government intervention via commodity reserve programs and acreage control programs designed to protect producers in periods of temporary surpluses and otherwise unacceptably low prices and consumers in periods of otherwise high prices and tight supplies. The current program enables farmers to take advantage of Federal loans to hold grain reserves when excess supplies would otherwise force prices below minimally acceptable levels. When market prices exceed first reserve release levels and then reserve call levels, reserves are drawn down to enable farmers to sell at a profit and to protect consumers from higher prices and possibly inadequate supplies. If reserve buildups exceed program objectives, the production control provisions of the act—the acreage set-aside and diversion programs—can be activated to limit the public cost of program administration.

Program modifications will be needed, however, to strengthen the role played by market forces in the allocation of resources, the pricing of products, and determining returns to producers. Modifications will also be needed to enhance the role of commodity reserves in stabilizing returns to producers and the prices and supplies of basic agricultural products available to consumers. Should the 1977 grain reserve programs serve as a model, more attention will have to be given to setting reserve prices in line with longer term market equilibrium prices to discourage resource misallocation and production inefficiencies. Greater attention will have to be given to setting the appropriate margin between release and call prices so as to minimize the reserve's adverse impacts on orderly marketing.

As circumstances warrant, commodity programs will have to be expanded to other products such as oilseeds and cotton. Attention will also have to be given to modifying production adjustment programs to encourage greater farmer participation and to tie individual commodity programs to sector wide capacity management and development goals.

Fuller use of farm resources and longer term prospects for real price increases do not necessarily imply that all will be well with respect to net short-term returns to producers. With the costs of producing agricultural products likely to increase at or above the general rate of inflation, the farm programs of the eighties will have to provide greater insurance in the short term so that producers will not be caught between lagging or temporarily depressed farm prices and rising costs. However, it will also become increasingly important that the undesirable side effects of past income programs—that is, misallocated resources, production inefficiencies, food price inflation, and large Government outlays—be avoided. These goals might best be achieved by placing greater emphasis on relating income goals to reserve prices, relating short-term financial protection from lagging prices and rising costs to loan rates adjusted annually to reflect changing costs of production, and reexamining the role of target prices.

Also of increased importance in the early eighties will be complementary farm finance programs, particularly farm credit programs. The growing importance of purchased non-farm inputs and the need for investment funding will tend to increase the farm sector's credit needs substantially. Emphasis on revamping existing credit programs will have to be placed on determining reasonable farm credit needs, the proportion to be secured from public sources, and the rates at which credit from Government sources should be made available to farm concerns.

Also of concern in the eighties in designing commodity and farm programs may be their impact on the structure of agriculture—on the growing concentration of farm resources in the hands of fewer and fewer farmers. Also of increasing

concern will be the impact of farm programs on inflation. Setting program price indicators in line with longer term equilibrium levels, however, will tend to minimize product price and input price inflation.

The importance of administering these programs effectively should not be understated. The return on well run programs in the early eighties is likely to be even greater than in the last half of the seventies. But with U.S. agriculture functioning far closer to capacity and with fluctuations in supply and demand more volatile and less predictable than in the sixties and seventies, the margin for error in program management will be significantly narrower. The demands made on these programs and their potential benefit to the farm sector and the macroeconomy in general will be unprecedented.

Resource and Productivity Programs. Effective management of the agricultural sector in the longer term will also depend on development of resource management and productivity growth programs—both to expand agriculture's long-term capacity to produce and to ensure that short-term demands on production in periods of tight supply are not met at the expense of agriculture's longrun productive potential.

The need for improved resource programs—particularly programs to plan and monitor resource use, to ensure better management of publicly owned lands, and to encourage proper use of privately owned land—is likely to be particularly marked toward the mideighties. The components of a program to plan and monitor national resource use are already in place. Four recent acts of Congress—the 1975 Forest and Rangeland Renewable Resource Planning Act, the 1977 Soil and Water Resource Conservation Act, Title 14 of the Food and Agriculture Act of 1977, and the 1978 Renewable Resources Extension Act—established the framework for a national resource planning capacity. But greater coordination across these efforts is needed; greater effort is also needed to integrate their planning and monitoring results into programs affecting resource use. Also needed is greater emphasis from existing programs on managing the public lands and other natural resources directly under Government control.

Given the proportion of resources in the agricultural sector privately owned, successful resource management and development programs will ultimately depend on their impact on individual farmers. In the short term, attention will likely be given to how public policies and programs affect incentives for sound land and water use and farming practices. Over the longer term, programs will need to address land and water use issues directly. Policymakers will also have to be more alert to market imperfections and program rigidities that slow adoption of environmentally sound technology or prevent efficient resource shifts in response to environmental pressure.

Policymakers will also have to address the problem of productivity growth. While recent weather related fluctuations in yields make it difficult to measure growth in productivity precisely, productivity growth appears to have slowed from 2 or more percent per year during the fifties and sixties to roughly 1.5 percent in the seventies. This slowdown is not surprising given the declining resources allocated to research and development. Funding over the last decade has not increased sufficiently to keep up with inflation or the increase in the research and development issues to be addressed. Maintaining even the slower 1.5-percent rate of growth in the eighties will depend on strengthening financial support—particularly support for research in the production sciences and research aimed at shortening the lags between laboratory discovery and farm adoption.

A new farm act will also have to provide Government leadership in at least two other critical areas—namely, expanding and upgarding the agricultural marketing system, particularly its transportation component, and developing the agricultural component of a national energy policy.

The basic issues involved in developing a national agricultural transportation program were outlined recently in the report of the President's Rural Transportation Advisory Task Force. The task force recognized that agriculture faces serious short-term transportation problems ranging from boxcar shortages to skyrocketing truck transport costs, as well as a myriad of longer term problems related to investment, regulation, and interrelationships among different transportation modes. The task force correctly identified the main issue, however, as the need to draw up a single integrated agricultural transportation policy. There has not been action yet, however, to move beyond task force discussion to policy formulation and implementation. The long lead time involved in overhauling existing and developing new transportation systems makes it crucial that we begin early in the eighties if we are to avoid serious, possibly debilitating, transportation bottlenecks by the mideighties.

The prospect for tightening supply and demand balances and possibly real increases in commodity prices and costs of production suggest the need to carefully monitor the appropriate role for agriculture as a source of energy through production of biomass for alcohol. A myriad of Federal, State, and local programs are already in effect or in the development stage, even though several basic issues have yet to be settled. Among them are the fundamental questions of whether an aggressive energy-from-agriculture policy can or should be adopted at the cost of higher real food prices and a net loss in foreign exchange as petroleum savings are offset by losses in agricultural exports. Moreover, if real farm prices increase in the early eighties, the Government outlays entailed in subsidizing conversion of grain to fuel

could become increasingly prohibitive before the end of the decade.

International Policies and Programs for the Eighties

The global food supply/demand balance outlined above suggests that the food exporting countries—particularly the United States—will face a fundamentally different world market in the eighties than during most of the postwar period to date.

Through most of the last three decades, the world market was characterized by abundant, often excess, supplies and falling real prices for virtually all major agricultural products. In an essentially buyer's market, the United States and several other exporting countries carried a disproportionately large share of world stocks, absorbed a disproportionately large share of global price and quantity adjustments to both shortfalls and windfalls, and functioned as a price-taker rather than a price-setter. Many importing countries, such as the members of the European Community, were able—particularly given the exporters' commitment to utilizing more of their productive capacity than market prices dictated—to levy what were in effect optimum import taxes of up to 100 percent or more.

The trade policies and programs in effect in the United States through most of the fifties, sixties, and seventies recognized and reinforced these basic problems. They reflected an overriding concern with our excess capacity problem and our wartime experience with exports as a means of easing the farm sector's disequilibrium problem. Given the magnitude of the capacity problem, postwar policymakers rightly concluded that programs to expand exports—even at the stock, stability, and price costs noted above—were an integral part of their broader complex of food and agricultural policies. Expanding foreign demand for our farm products enhanced commodity prices and farm income, helped slow the flow of resources out of the agricultural sector into the general economy to a more manageable rate, and reduced Federal budget expenditures and improved the trade balance. Given the information available on production economies, export expansion policies were also supportive of, or at least compatible with, programs to ensure domestic consumers abundant supplies of reasonably priced products. Quite simply, the opportunity cost of producing large quantities of farm products for export appeared to be low and possibly negative.

A strong sense of the positive impact of agricultural exports underlay our postwar policy stance in favor of liberalizing world agricultural trade, particularly trade in grains and other products in abundant supply in the United States. The inter-

national programs developed over the first 25 years of the postwar period included commercial export promotion programs, food aid programs, commercial credit programs, development assistance programs and—for selected products such as wheat—export subsidy programs all designed to promote long-term growth in foreign demand for our products and to ease shorter term surplus disposal problems.

The scenario for the eighties outlined in this paper suggests that future international policy and programming decisions will have to be made in a markedly different setting. Put quite simply, strong sustained growth in exports may no longer be an unmixed blessing. Exports in the volume likely in the eighties could have quite high opportunity costs—in the limited sense of the expenses incurred in their production and marketing but even more so in the broader sense of impacts on domestic prices, resource use, and the environment.

Realigning International Agricultural Policies in the Eighties.

Should the scenario outlined above materialize, there will be several general policy areas in need of reassessment. First and foremost, policymakers will face the critical problem of defining precisely what role trade will play in our farm sector. Do we on the one hand use more of our resources more intensively to meet world demand, at the expense of significant conservation and food price inflation costs and, equally important, at the expense of taking on more of the structural characteristics of the world market? Or do we, on the other hand, limit exports to levels compatible with our domestic food and agricultural goals and our broader social, political, economic, and environmental goals?

Heretofore, temporary shifts in import demand overseas due to weather or policy factors and/or fluctuations in production in the United States forced policymakers to establish priorities on conflicting trade policy and domestic agricultural policy goals. However, this involved short-term trade-offs between foreign and domestic consumers but no change in our basic longer term commitment to maximize exports. The new resource equilibrium emerging in agriculture will force us to take a fundamental look, as the eighties progress, at what level of exports is good for the economy as a whole in the short term and at what rate of growth in exports is advisable over the longer run.

Among the more specific policies and programs to be reviewed will be our position on agricultural trade liberalization and export marketing. In the past, the United States perceived that its best interest lay in promoting the liberalization of world agricultural trade, at least in part as a means of expanding export markets. The United States pressed its

major trading partners in a number of international forums, albeit with limited success, to liberalize trade in the major products of export interest to the United States. Prospects for the eighties suggest that U.S. interest in trade liberalization will be even greater—not so much as a means of expanding export outlets but as a means of stabilizing the world market by spreading widening interannual price and quantity fluctuations across as large a number of countries as possible. The case the United States can make for trade liberalization as the supply/demand balance tightens will be stronger in the eighties than ever before. Should the major importers and possibly other exporters continue to use restrictive trade policies to allocate a disproportionately large share of world market fluctuations to the United States, alternative marketing strategies would have to be considered.

The experience of the last several years, however, has led many theoreticians and practitioners to conclude that an even more fundamental rethinking of trade policy is in order. This conclusion has been sparked at least in part by the realization that, while on balance, the U.S. export boom of the seventies came at a significant cost to the agricultural sector and the economy in general. Moreover, the protectionist trade policies in effect in many of the major importing countries appear to have minimized the share of these costs borne by foreign consumers. Trade policies abroad worked to skew the benefits of trade in the importers' direction. The inequality of this distribution became more apparent as the cost of producing for export increased substantially without a compensating increase in returns. Given the export prospects for the early eighties, the cost of free trade—as known and practiced by the United States largely in isolation from most of the major importing and the other exporting countries—could increase significantly.

The issue ultimately centers on how the United States is to maximize the return on its increasingly costly participation in what could be an increasingly unstable world market. Do we continue to function largely as free traders in a protectionist world and allow foreign consumers open access to our supplies? Or do we weaken, possibly break, the linkage between our domestic market and an increasingly unstable world market? Do we modify our export marketing strategies—possibly in favor of trade arrangements or some form of export marketing boards—to ensure that export receipts cover the full cost of producing and marketing agricultural products? Such a program would be most effective if done in conjunction with an effort to measure the full social, economic and environmental costs of producing agricultural products.

A related issue likely to arise in the future is the need for and focus of export promotion programs. While export promotion programs may appear initially to be superfluous in the eighties, their role might well expand if focused on promot-

ing products that minimize pressure on our resource base and food price inflation but maximize value added and the benefits for the farm sector and general economy.

The success of as basic a reevaluation of policies as noted above will depend not so much on U.S. domination of world food production but, as OPEC demonstrated, the U.S. role in filling the relatively narrow gap between abundance and shortage in a highly price-inelastic market.

International Reserves and Food Aid. The 1981 farm legislators also face the more specific questions of international reserves and food aid. While the short-term food and agricultural supply/demand situation will undoubtedly influence the timing and content of any U.S. position on an international grain reserve, the United States' longer term interests are clear. Without some international system of food reserves, the increasingly wide interannual quantity and price fluctuations will force the United States either to accumulate large enough reserves to stabilize its own as well as the world market or to break the price linkage between the domestic and the export markets.

An international reserve governed by precise operating rules and geared to longer term world market equilibrium prices would share the cost of market stabilization among as many countries as possible. The reserve policy adopted by the United States, however, will have to deal with the details of reserve size, and reserve pricing procedures in order to assure that a reserve does not take on an important bias in its day-to-day operation.

The changing food balance likely in the early eighties will also force the United States to review its food aid programs. The food aid programs of the last three decades served as outlets for surpluses, as market development tools, and as vehicles for aiding developing countries. The fluctuations in aid flows over the sixties and seventies reflected changing emphasis on these three different goals. In the early eighties, the need for surplus disposal and market development is likely to decline significantly while the cost of aid will increase substantially. The production, population, and income trends noted above suggest, however, that food aid needs overseas will increase substantially in the early eighties. At issue then will be our commitment to meeting increasing food aid needs even at the expense of foregoing commercial sales.

The situation points clearly toward our interest in—and our stronger position to insist on—a more equitable international sharing of emergency food aid responsibilities and in aid

programs designed to help developing countries meet longer term food aid needs themselves through growth in indigenous production.

Common to both the food aid and reserve issues is the United States' vested interest in a more equitable sharing of the costs and benefits of trade and aid.

Conclusions

This paper explored the implications of one possible—albeit an increasingly probable—scenario for the world food balance in the eighties for U.S. agriculture. Given the uncertainties surrounding the major factors that will eventually determine the food balance ahead, the paper's main conclusion—namely, that we face an increasingly tight and significantly more volatile world food balance ahead—is in need of qualification.

Many of the qualifications needed are highlighted in the text. Among them is a general uncertainty regarding the macroeconomic setting likely in the eighties and more specific questions of the magnitude of the real price changes ahead and the levels of U.S. production associated with alternative price levels. Also in question is the reaction of foreign producers, consumers, and agricultural and trade policymakers to tighter supplies of, and higher prices for, U.S. agricultural exports.

While limited, our past experience with tight supplies and rising real prices suggests that adjustments in foreign supply, demand, and trade will not be significant enough to reverse the general direction identified in the text of this paper. Strong production responses or demand reactions overseas could well appear to reverse the tightening of world supplies outlined above. But this would quite likely be a temporary postponing or at best an easing of the adjustments in demand, resource use, and policy needed before the end of the decade.

Hence, the farm and food problems of the early eighties will include many of the same problems that have concerned policymakers over the last three decades. However, with the world food balance shifting gradually toward a tighter supply/demand balance, the less conventional problems that troubled policymakers in the middle and late seventies are likely to become more important as the decade progresses. As a result, the return on effective policies and programs could well be greater in the early eighties than at any time in the past. Policy and program decisionmaking, however, will be significantly more sensitive to error than ever before as we use more of our resources more intensively to produce food, feed, and fiber.

Global Prospects

Changes in the Farm Sector

The Changing Farm Sector and Future Public Policy: An Economic Perspective

J. B. Penn*

Even though the functioning of the farm sector is closely monitored, its behavior carefully studied, and each component detailed in an array of statistics, our understanding and perception of the state of agriculture frequently needs updating. The expiration in 1981 of the omnibus Food and Agriculture Act of 1977 makes this a fortuitous occasion to examine the farm sector as it exists today, the milieu in which farm economic problems develop, and the nature of the problems that should be the object of public policy.

This paper develops a perspective on the farm sector that is current and relevant to the formulation of public farm policies. Since present and future policies are so importantly conditioned by the past, the paper begins with a brief retrospective view. That review examines the persistent 'farm problem'—the chronically low earnings that arose from extensive disequilibrium, provided the rationale for farm policy for over 50 years, and indeed, remains the underlying premise for much of that policy today.

The second section examines the events of the seventies, now widely viewed as a time of transition for the agriculture sector. The third section examines likely future global food production and consumption, a major determinant of the economic environment for agriculture during the eighties. The next section contains a profile of the farm sector today, focusing on those characteristics deemed most important to future policy development. From this profile, the nature of today's economic problems for major groups of farms are examined and, for the primary producers, seen to be in sharp contrast to the problems that long prevailed.

The final section summarizes the perspective developed in the paper. It draws implications relevant for structuring policy for a new and unfamiliar era in American agriculture.

A Retrospective View

After many years of study and rhetoric, a consensus has finally evolved on the nature and causes of the chronic and

major economic ill that had come to be referred to as the farm problem. It is now known to have been a severe resource maladjustment in the Nation's farm sector; that is, too many resources were devoted to farming. The amount of food needed could have been produced by far fewer farmers, and technological improvements (in machinery and crop strains, for example) kept reducing further the number of farmers that could meet the food demand. As a result, many farmers were poorly paid for their production and abandoned farming.

The Historical Farm Problem

The farm problem can be traced to the transformation of this country from one that was primarily agrarian to one that is primarily industrial. The Nation was still largely rural through the beginning of the 20th century, with a high portion of the population engaged in agriculture. Immediately following World War I, technological advances in the form of machines and improved farming methods transformed farming into a highly competitive sector necessitating that farmers adopt the newly emerging technology or be quickly placed at a disadvantage to others who did so. The demand for farm products expanded much more slowly than the capability to produce them due to their low income elasticity (as consumer incomes rose, the increases in food expenditures were much less than proportional). These conditions caused the supply of farm products to grow persistently at a rate faster than the growth in demand. The result was "disequilibrium"—too many resources, especially labor, devoted to food and fiber production. The disequilibrium manifested itself in underemployment and low returns for agricultural labor and low commodity prices.

The problem was succinctly characterized as follows:

... the labor and capital employed in the industry cannot all continue to earn, by producing goods for sale in a free market, as much income as they formerly earned, or as much as they could earn in some other use; that is—the industry is using too many resources. (2)¹

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¹ Italicized numbers in parentheses refer to items in the References section at the end of this article.

The problem was chronic as the excess labor flowed slowly out of agriculture. The costs of movement, lack of training, lack of knowledge about, and, in some periods, too few nonfarm job opportunities, and other obstacles kept the outmovement slow.

Brandow noted that:

Farm problems got on the Nation's policy agenda because dissatisfied farmers put them there. Dissatisfaction became widespread during the price collapse of 1920-21 and was sufficiently strong throughout the 1920's to engender much legislative activity culminating in the Federal Farm Board of 1929. Extreme distress on farms in the early 1930's was part of the Nation's economic and social conditions to which the New Deal was a response. Extensive Federal farm programs were firmly established by the end of the 1930's. (9)

The same fundamental rationale for those farm programs has been maintained over the 50 years they have existed: farmers as a group have been economically disadvantaged by the stream of new technology that led to continued production increases, often far exceeding needs, making it possible for fewer and fewer farmers to supply the food and fiber needs of larger and larger numbers of people. That technology, financed in part by large public outlays, was deemed of great benefit to the American public; the public via the Congress thus acquiesced in helping to bear the adjustment burden through subsidies to the farm sector.

The implicit goal of the farm programs was thus the redistribution of incomes—the transfer of income from consumers and taxpayers to farmers whose incomes were significantly below the incomes of the rest of the population. The public subsidies were thus attempts to redress an economic inequity by helping to bring the incomes of farm people closer to the nonfarm average. This has not always been the sole objective (nor perhaps even unanimously agreed upon when stated in this way) and the emphasis has changed slightly from time to time as acute problems arose. Moreover, this compensation principle in earlier years may at times have been confused with a goal of alleviating poverty. However, it was eventually recognized that addressing poverty in agriculture through farm programs was grossly inefficient because of the basic structure of the programs.

A basic tenet of the farm programs since their inception has been to provide benefits to farms according to their volume of production: the greater the volume of output, the greater the benefits received. However, for a goal of alleviating poverty, this basic tenet would mean that the programs were grossly inefficient since most of the program benefits go chiefly to the larger farms whose incomes were well above any reasonable poverty criterion (1).

The Evolution of Farm Policies

The farm problem, surfacing soon after World War I, became enmeshed with the effects of the worldwide depression in the early thirties. This confounded any diagnosis, and consensus on its seminal causes did not emerge until much later.² The early policies and programs had elements of both the circumstances of the depression and the more immediate circumstances of agriculture. From initially treating the most apparent symptoms, the policies subsequently evolved over the next four decades in response to a growing understanding of the chronic nature of the farm problem and to changing economic circumstances.

The policies initially embarked on supporting commodity prices above market-clearing levels; that is, above levels that would have prevailed without Government intervention. However, while perhaps immediately beneficial, the programs had unintended adverse effects. Farmers responded to the higher price supports by producing even more; at the same time, the higher supports (prices) discouraged consumption (industry even sought to develop substitutes, such as margarine and synthetic fibers), and the problem perhaps became even more severe. It soon became obvious that, if the price support system were to succeed, production would have to be controlled.

The next step, then, was to constrain the production of the crops in excess supply. Rigid supply controls—marketing quotas, acreage allotments, and other measures—were applied to the crops being produced in overabundance. But with no coordination across the various commodities, farmers restricted in producing one crop turned to another, and supply-demand imbalances arose in other commodities. Also, newer output increasing technology appeared and was rapidly adopted, causing a continuation of production in excess of effective demand. There were side effects from the production controls as well. The allotments fixed production or resource use patterns and that rigidity prevented the adjustment of resources as changing conditions warranted, thus contributing to a misallocation of resources in the economy.

The farm problem persisted, interrupted only during war, and the programs continued, largely unchanged, until the sixties. By then, large stocks of surplus grains, cotton, and dairy products had accumulated under Government ownership, the competitiveness of U.S. farm products in world markets had been impaired by the high price supports, and the Treasury costs of the programs had become large and

² In a review of the post-World War II agricultural economic policy literature, Brandow ascribes the first comprehensive description of the farm problem to T. W. Schultz in his 1945 book, *Agriculture in an Unstable Economy* (9).

politically unsustainable.³ More economically rational policies were then introduced. Perhaps the most important of the policy modifications was a shift in the means for supporting farm incomes—away from sole reliance on price supports to making direct payments (so-called price support payments) for some commodities. This enabled the price supports to be lowered, reducing their interference with the markets, and the direct payments were then used to supplement farm incomes. This was the start toward the eventual separation in 1973 of commodity price support from income support and the use of different programs to pursue the objectives independently.

The successful features of the farm policies that had evolved over the years were incorporated into the Food and Agriculture Act of 1965. The act marked the start of a return to reliance on the market as the allocator of resources and products by reducing the interference of price supports with this function, by increasing reliance on direct payments to enhance incomes, and by embracing more voluntarism in the supply management schemes.

This was followed by the Agriculture Act of 1970. Dubbed the “consensus bill” even though not specifically embraced by any major farm organization or political party, it brought further changes in the traditional policy tools. The individual commodity approach to production control (for the major commodities) was discarded in favor of restraining the total capacity of the agricultural production plant. To be eligible for program benefits, farmers had only to idle a specific proportion of their cropland. Except for quota crops (rice, sugar, peanuts, tobacco, and extra long staple cotton), farmers were then free to plant whatever they deemed to be to their economic advantage on the remaining acres. The direct payments feature for feed grains, cotton, and wheat was continued.

The 1970 Act also limited, for the first time, the amount of payments an individual farmer could receive. It proved to be more symbolic than effective, however: a \$55,000 limit was applied to the cotton, wheat, and feed grain programs separately and it excluded CCC price-support loan proceeds.

The next major agricultural legislation, the Agriculture and Consumer Protection Act of 1973, continued the movement toward fewer program restrictions and greater reliance on market signals to guide producer decisionmaking. It incorporated a commodity target price/income deficiency payment system for the major crops, fully separating income support from price support. This scheme, patterned after a

concept first proposed in the late forties, provided for varying the income support to producers inversely with the market price.⁴ No payments are made if the market price is at or above the target price. If the market price falls below the target price, the payments are based on the differential. (The concept is more fully described in (14).)

The Congress, in its continuing search for a workable criterion for determining farmers’ economic welfare, also adopted a “cost of production” concept as the basis for annual adjustment of the target prices in the 1973 Act. This also marked the formal end of the use of calculated parity prices in setting support rates for such commodities as the food and feed grains and upland cotton. Parity prices, however, continued to be used for other commodities such as milk and tobacco. (For a concise history of the parity concept and discussion of the limitations of calculated parity prices, see (10).) The lack of adequate cost data at that time forced the use of a broad-based index of prices paid for agricultural inputs, but, by congressional directive, individual commodity cost estimates were developed after 1973. The payment limit was reduced to \$20,000, and made more stringent by applying to each producer and to the cumulative amount received from all programs (except CCC loans).

The 1973 Act was developed in an environment quite different from that prevailing when previous farm bills had been developed. Rather than evolving from an overriding concern with chronic surplus production, the 1973 bill came at a time of considerable uncertainty. The first of the Russian grain sales had occurred, and global demand for U.S. agricultural products had increased abruptly, forcing prices sharply higher. Whether this global demand was permanent or atypical was unknown at the time. However, commodity prices subsequently remained above the target prices and the program provisions were generally not used during the life of the act.

The current embodiment of broad farm policy is the Food and Agriculture Act of 1977. This act further modified and extended the policy tools. It provided for flexible price support levels (allowing them to be reduced if they interfered with competitiveness in export markets). The act increased reliance on cost-of-production, determined direct payments for income support (linking target price determinations to

⁴When proposed by Secretary of Agriculture Charles Brannan in 1949, the plan was a radical departure from existing programs. The Brannan Plan incorporated an income standard based on a moving average of income over the past 10 years. Price support standards were to be set for individual commodities as necessary to achieve the target income standard. Commodities would be sold at prices that would clear the market and any difference between the standard and the market price received would be provided through direct payments. The amount of a commodity eligible for the direct payment was restricted and production above this amount had to be sold at the market price, thus serving to restrain production.

³Dairy products, not being storable for long periods, were distributed to needy consumers both domestically (welfare food distributions and school lunch programs) and internationally (Public Law 480).

commodity-specific costs rather than the broad index of prices paid), abolished the rigid acreage allotments (substituting a current plantings concept, precluding program-induced rigidities), and, for the first time ever, embraced a formal grain reserve. It is this legislation, expiring in 1981, that must be extended by the 97th Congress.

Basic Tenets of the Farm Programs

The changes in farm policy over the years have usually followed events rather than determined them. Policy evolution has also shown a remarkable degree of continuity, in fact, much more continuity than change. Many of the mechanisms (the policy instruments) that were put in place very early survive today.

Policymakers, viewing the income problems of farmers, initially adopted mechanisms that were price increasing, assuming that higher prices meant higher incomes. These mechanisms continue to emphasize commodity price enhancement, although perhaps not as overtly for the major commodities. (Dairy, of course, is an exception to this.) Even the grain reserve formed in 1977 was largely motivated by an objective of raising grain prices. Thus, a major tenet of the programs from the beginning to today is the use of commodity price-enhancing mechanisms. But, over time the distribution question—which groups of farmers are receiving the higher incomes from the higher prices and at what cost to taxpayers and consumers—has become much more important, but never adequately treated in policy and program formulations.

Another basic tenet of the programs, maintained from their inception to date, is the provision of benefits to farmers based on volume of production. Quite simply, this means the larger the quantity of commodities produced, the more subsidies a farmer receives. When the programs were initiated in the early thirties, farm numbers were near their peak of almost seven million and the benefits were perhaps more equally distributed among all farms. As farm numbers have declined over time and the average size correspondingly increased, the fewer large farms with greater volume have tended to receive a much higher proportion of the total program benefits than have the more numerous smaller volume farmers. This skewed distribution of benefits among farmers has long been known and thoroughly documented in studies by Bonnen, Schultze, and Lin, Johnson, and Calvin (1, 18, 8).

Another enduring tenet is the use of national averages in developing program parameters applicable across the entire farm sector. The commodity target prices are based on national averages of crop production costs for all farms regardless of size, location, and circumstances. The nonrecourse loan rates are likewise national averages. The use of national averages implicitly assumes a homogeneous agricul-

tural sector populated with similar farms producing the program crops, a very dubious assumption now, although perhaps less so when adopted in the thirties. The effects of using national averages—windfall gains to some producers and too little benefits to be meaningful to others—may have contributed to distortions in resource use and may have been an important factor in the changing farm sector structure. (Some implications of this are illustrated in the paper by O'Brien elsewhere in this issue.)

Agriculture in Transition—The Seventies

Even though the farm programs were being made more economically rational in the midsixties, the lingering symptoms of the farm problem were perhaps most pronounced at the turn of the decade. Stocks of surplus grain under Government ownership were huge, program costs high, and a large amount of the cropland idled by Government programs. But, global and domestic forces, some long in the making and which had gone largely unnoticed, were converging to alter that situation. In the world economy, a much closer balance between the demand and supply for the output of America's farms was gradually evolving. Rapid growth in global population and incomes, together with a heightened sensitivity to hunger and malnutrition, were leading to increased demands for U.S. agricultural output. Further, the concurrent shift of some centrally planned economy countries from being net food exporters to net importers worked to the same effect. Meanwhile, however, the supply of U.S. farm output was rising less rapidly; the rates of crop yield increases in the very early seventies were slowing from the impressive gains of the sixties.

Several unique events in the early seventies caused an abrupt change in the supply-demand balance for food. Foreign exchange rates were first realigned in 1971 (increasing the competitiveness of U.S. products in foreign markets), wage and price controls were imposed on the domestic economy, adverse weather brought poor harvests to parts of the world, and some major countries (particularly the Soviet Union) changed their policies toward responding to food shortages.

This convergence of long-term forces coincided with the more abrupt events of 1972. Russian entry into our grain market was first revealed in mid-1972, beginning a tumultuous period for U.S. agriculture, which perhaps stripped away trappings to reveal developments of even greater significance over the long run.

Parts of the agricultural sector enjoyed nearly unparalleled prosperity during 1973-75; record volumes of exports pushed crop commodity prices to record-high levels while farmers' production costs lagged considerably, significantly increasing profit margins. Real net farm income for the sector in 1973 reached its highest level since World War II. Although down

sharply in 1974 and 1975, farm incomes remained well above the average of the previous decade.

But this economic boom for parts of the farm sector was not without its undesirable side effects. Expectations of permanent prosperity were created in the farm community. Many young people entered farming during this period; many existing farmers expanded their capital investment in land and machinery; and land prices were bid up substantially. Both groups contracted large debt at the inflated asset prices—based on expectations for what subsequently proved to be unsustainable conditions.

Domestic food prices also increased sharply during this period. Consumer food expenditures rose by over \$50 billion, and low-income consumers were affected severely. Domestic inflationary pressures were exacerbated, leading to commodity export embargoes that strained relations with many of our longstanding trading partners.

While crop farmers prospered, the livestock farmers were buffeted by the volatile grain markets and forced into one of their most unprofitable periods. These conditions subsequently precipitated the sharpest liquidation of the cattle herd in history, the ramifications of which are still present today.

Fundamental changes in the farm sector had been occurring before the seventies; but these, too, went largely unnoticed, undoubtedly obscured by conditions that had come to characterize agriculture. Ironically, in the year of the initial disruption (1972), 62 million acres, nearly one-fifth of the Nation's cropland (and the second largest acreage ever), were idled by programs. Grain prices had remained depressed because of the overhang of surplus stocks on the market. These conditions no doubt masked the more fundamental changes that were bringing supply conditions into closer accord with demand.

It is now rather widely accepted that the resource disequilibrium long plaguing the farm sector was passing around the beginning of the seventies, but remaining vestiges of the farm problem obscured the change. One of the early persuasive arguments of this view was advanced by D. Gale Johnson in a monograph appearing in late 1972 (4). Johnson later argued:

... that most of the resources that had been retained in U.S. agriculture during the early 1950's and early 1960's had been eliminated, primarily through adjustments in the labor market and the significant abandonment of farm land. The labor market adjustment prior to 1950 had occurred primarily through migration away from farms but starting in the 1950's part-time nonfarm employment played an increasing role in labor adjustments in agriculture. In 1960, the first year for which we have data, 42 percent of the in-

come of farm operator families came from off-farm sources; by 1970 the percentage had increased to 55 and in 1976 and 1977 to 62 percent. In large part as a result of the reduction in the number of farm workers and the increase in off-farm income, the per capita disposable income of farm relative to non-farm people increased from less than 50 percent in the latter part of the 1950's to about 75 percent in 1970 and 1971. Given the characteristics of the data and the fact that capital gains are not included in the income data, farm per capita disposable income that is 75 to 80 percent of non-farm is probably not far from an equilibrium level. By equilibrium level I mean one which provides approximately the same return to farm resources, both labor and land, as is received by comparable nonfarm resources. (5)

In 1976, Schuh reinforced Johnson's argument citing the significant changes that occurred in the economic environment of agriculture in the early seventies—reduced labor outmigration from agriculture, stagnating productivity growth, the shift to floating exchange rates, and changes in the international economic environment. Drawing one of the implications of this combination of changes, he stated:

The secular income problem in agriculture is now largely behind us. The emerging equilibrium in the labor market is of major significance in this respect. When this equilibrium is combined with the decline in the rate of productivity growth, the release of most of the idled land back to production, and the shift to the right in the demand for agricultural products as a result of devaluation, the result is an almost total disappearance of the excess capacity that existed at prevailing price ratios for such a long period of time. (17)

The subsequent evidence—the slowed net labor outmigration from the farm sector, the emerging equality of the per capita incomes of farm and nonfarm people, the essentially full utilization of the readily available cropland, and the continued strong demand for U.S. products in foreign markets—strongly supports an assertion that the farm sector is now in near equilibrium and perhaps has been so for several years.

This does not in any way, however, imply that a static state has been reached, that there will not again be times of supply-demand imbalances resembling former periods. There may well be, but these will likely be transitory, most likely arising from brief periods of favorable global weather conditions, rather than reflecting any chronic imbalance as in previous decades.

Resource equilibrium, combined with the likely future economic environment (treated in the next section), has signifi-

cant implications for the domestic farm sector and the structure of policies appropriate for that future.

The Prospective Economic Environment: The Eighties

The previous discussion has suggested that the long period of chronic overproduction, burdensome surpluses, and low farm incomes may have passed, and that there appears to be little shortrun slack in the production sector at present. While this development alone is significant enough, the implications become even more significant when considered in the context of the likely economic environment for agriculture in the eighties.

Most agricultural previews of the eighties are in general accord that the global food production and consumption balance will become even more tenuous, marked by increasingly smaller margins, greater annual variability, increased total trade, and greater demand for U.S. exports. A detailed analysis by O'Brien, in the previous article of this issue, contains findings that, if realized, will have tremendous implications for U.S. agriculture:

- The global demand for agricultural products could expand at or near record rates annually during the eighties, despite some slowing in population growth rates and generally sluggish economic activity, especially slower growth in the developed countries.
- The growth in global food production in the eighties may slow to about three-fourths of the historical rate. And, even this rate of growth will come only at substantially higher costs and from sources different from the past. Further production increases from the relatively inexpensive expanded use of arable area are likely to be significantly smaller than at any time over the last three decades. The expansion that does occur will be onto more marginal (fragile) lands, further exacerbating annual fluctuations in production. Accelerating productivity growth will thus become an even more important source of output increases. However, to the extent that productivity increases depend on augmenting land with energy intensive inputs, those increases will be more expensive in the future and thus unlikely unless commodity prices are higher.
- Few countries would have been able to support the gains in food consumption reported in the last three decades through increases in indigenous production alone. The gains were made possible by world trade, growing at more than twice the rate of production and consumption.

- Global supply/demand prospects suggest that the world will depend increasingly on supplies from the United States, and that increases of 7 to 9 percent per year in U.S. exports may be necessary to meet that demand. The growth in U.S. export demand will be strongest for feed-stuffs (coarse grains and oilseeds), with less growth for food grains (wheat and rice).
- Growth in demand for U.S. products will become significantly more variable from year to year; the increasingly dominant U.S. role as a world food supplier means that swings in production and consumption virtually anywhere in the world will translate into amplified fluctuations in demand for U.S. products and greater market instability.
- The growth in domestic demand for agricultural products is expected to average between 0.8 to 1.1 percent annually, compared with 1.2 percent during the seventies. However, the future rate could surpass the historical rate should unconventional sources of demand, notably agricultural products for fuel and industrial uses, become more feasible.
- Overall, total demand (domestic and world) for U.S. agricultural products could grow by as much as 3 to 3.2 percent per year on the average, yet fluctuate as widely as 10 to 15 percent per year. Meeting this growth in demand would entail expanding U.S. production between one and one and one-half times the average rate of the post-World War II period.
- Real prices received by farmers could increase an average of 1 to 3 percent per year, in sharp contrast to the 1- to 2-percent annual average decline since World War II.

A world remaining relatively peaceful and modestly prosperous will almost certainly generate continued strong growth in U.S. agricultural exports, especially coarse grains and oilseeds. Additionally, farmers will probably see real price increases for these products, signaling the need for even more production.

The emphasis of food and agricultural policy and the day-to-day concerns of policy officials charged with managing policy could well be the opposite of past decades. Rather than being faced with overproduction and surpluses, those charged with supply management will more likely confront shortages and respond by encouraging production. The policy concerns will likely become much broader and involve questions significantly different from those traditionally treated.

One question that would emerge from the O'Brien scenario (see previous article) is the nature of the supply function for

land. If the function turns up sharply, this means higher product prices and higher food prices. It also implies windfall profits for owners of productive land, profits that can be used to outcompete others for land and thus contribute to further concentration of landownership and production. Further, conservation will become even more critical. As the increase in real prices encourages the expansion of production onto more fragile lands, environmental degradation may be greater, implying a loss in future production capacity. This would raise the issue of whether we are exporting our natural resources, of whether market prices are really reflective of all incurred social costs (loss of topsoil, environmental degradation, subsidized water, subsidized transportation). The impacts of the intensifying competition for land between export crops and other lower return crops (such as forage) will work themselves through the food system and will show up in the cattle cycle, supplies of beef, retail food prices, and related issues. Inevitably, the tradeoffs among domestic food, natural resource, and trade policies would come to the forefront.

A Profile of the Farm Sector

This section, in profiling the farm sector—its land, people, and productivity—and examining the farms in some detail, shows just how much farming has changed in the past decade.

Land in Farms

The total land area in farms has changed relatively little in the 20th century (table 1). Land development was still being encouraged early in the century (the 1902 Reclamation Law, for example) and nearly 150 million acres were added to farms in the next three decades. Land in farms continued to increase slightly until 1950, then declined steadily until 1978.

Land in farms is used for crops, pasture, fallow, forests, lots, and the farmstead. Total land used for crops was greatest just after World War II and was least in the late sixties and early seventies when large acreages were idled by Government programs (table 2). Land used for crops in 1979 was the same as in 1929, yet, many of the current crop acres are significantly more productive, owing to improvement in irrigation, drainage, forming conservation practices, and other measures. The total cropland base (excluding pasture land) is slightly larger than the total used for crops in any one year, suggesting that some additional acreage (undoubtedly of lower quality) may be available for cropping if economic conditions warrant.

While there is general agreement that some relatively small additional acreage exists, which could be brought into pro-

Table 1—Land in farms, 1900-78

Year	Land in farms ¹	Change
	<i>Million acres</i>	<i>Percent</i>
1900	839	
1910	879	+4.8
1920	956	+8.8
1930	987	+3.2
1940	1,061	+7.5
1950	1,159	+9.2
1954	1,158	0
1959	1,120	-3.3
1965	1,110	-.9
1969	1,062	-4.3
1974	1,017	-4.2
1978	1,031	+1.4

¹ The data are not adjusted for changes over time in methodology or definitions.

Sources: *Economic Tables*, U.S. Dept. Agr., Econ. Res. Serv., June 1975, and Census of Agriculture, 1978.

duction rather quickly, there is much less agreement on the quantity that could eventually be used for crops. The estimates range from a few to several million acres of varying capabilities. However, it is clear that the larger the amount, the greater the investment required to make that land suitable for sustained production. This investment, of course, will occur only when economically feasible—when the expected future stream of real returns to agricultural production justifies the commitment of capital to this particular use. Greater public awareness of the fragility of the entire natural resource base and its interrelation with the quality of the environment has made future production capacity of American agriculture a much more immediate issue than it was a decade ago.

Other issues, somewhat separate from capacity, surround the Nation's resources and the use of those resources. One such issue is the ownership and control of the land and the effects of emerging landownership patterns on agriculture. A recent landownership survey revealed how highly concentrated is ownership of farmland (table 3). One percent of the landowners own 30 percent and 5 percent own 48 percent of the farmland.

How farmland ownership is distributed is important in developing agricultural policy, particularly when one considers that many of the benefits of past farm programs have been capitalized into asset (primarily land) values, hence accruing to the owners of the land. Further, there is a growing trend

Table 2—Major uses of land, 1924-79

Year	Cropland harvested	Crop failure	Fallow	Total used for crops	Idle	Pasture	Total cropland, excluding pasture	Acres idled by programs
<i>Million acres</i>								
1924	346	13	6	365	26	NA	391	0
1929	356	13	10	379	34	NA	413	0
1934	296	64	15	375	40	NA	415	0
1939	321	21	21	363	36	NA	399	0
1944	353	10	16	379	24	NA	403	0
1949	352	9	26	387	22	69	409	0
1954	339	13	28	380	19	NA	399	0
1959	317	10	31	358	33	66	391	22
1964	292	6	37	335	52	57	387	55
1969	286	6	41	333	51	88	384	58
1972	289	7	38	334	51	NA	385	62
1973	316	5	31	352	32	NA	384	19
1974	322	8	31	361	21	83	382	3
1975	330	6	30	366	NA	NA	NA	2
1976	331	9	30	370	NA	NA	NA	2
1977	338	9	30	377	NA	NA	NA	0
1978	331	7	31	369	NA	NA	NA	18
1979	342	7	30	379	NA	NA	NA	12

NA = Not available.

Sources: Adapted from *Changes in Farm Production and Efficiency, 1978*, SB-628, U.S. Dept. Agr., Econ. Stat. Coop. Serv.; *Major Uses of Land in the United States, 1950*, TB-1082 (Supplement) September 1953, U.S. Dept. Agr., Bur. Agr. Econ. and published reports in the USDA land use series since 1950.

Table 3—Distribution of landownership and age of landowners (farmland), 1978

Region	Proportion held by—		Age				
	Largest 5 percent	Largest 1 percent	Under 35	35-49	50-64	65-74	75 and over
<i>Percent of acreage</i>							
Northeast	34.2	13.8	7.8	29.1	38.4	16.3	8.4
Lake States	24.2	8.4	9.6	31.3	36.0	15.2	7.9
Corn Belt	24.6	7.9	6.2	25.1	37.4	18.5	12.8
Northern Plains	32.7	14.9	6.4	24.0	39.9	19.5	10.2
Appalachian	39.1	17.0	6.5	24.1	37.5	20.5	11.4
Southeast	49.2	21.1	4.3	22.1	42.1	20.4	11.1
Delta	45.8	23.0	5.2	25.1	37.2	22.2	10.3
Southern Plains	53.6	33.4	4.7	20.1	39.6	21.3	14.3
Mountain	67.2	37.6	5.0	26.5	43.6	17.9	7.0
Pacific	71.0	43.0	4.3	23.1	42.4	18.2	12.0
United States	48.1	30.3	5.9	24.6	39.8	19.1	10.6

Source: 1978 Landownership Survey, U.S. Dept. Agr., Econ. Stat. Coop. Serv.

toward separation of ownership and operation of farms (nearly half the cropland is farmed by someone other than its owner).

The age of farmland owners—people 50 years old or more own almost 70 percent of the farmland—suggests large inter-generational transfers of land will occur in the coming two or three decades. How these transfers occur—whether through inheritance, open market sales, or sale to institutional buyers—will importantly affect the ownership of land, the organization of farming, and who the future farmers will be.

The Farm Population

The U.S. farm population numbered 32 million, 30 percent of the Nation's total population, when first separately enumerated in 1920 (fig. 1). It has declined almost continually since, generally corresponding to the decline in the number of farms. In 1979, the most recent year for which data are available, the number of persons living on farms was 6.2 million (table 4): Only 1 in 33 (about 3 percent) of the Nation's 220 million inhabitants resided on a farm. This esti-

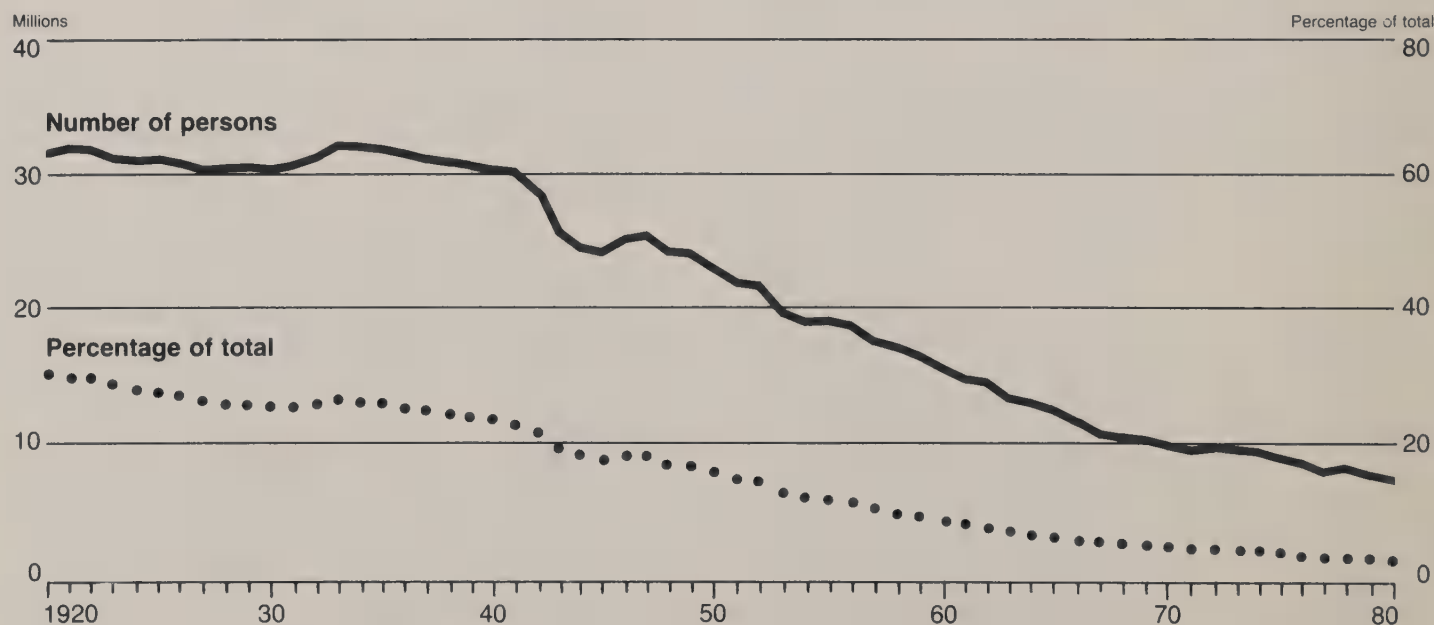
mate is based on the new definition of a farm (1978) in which the farm population consists of all persons living in rural territory on places with sales of agricultural products of \$1,000 or more per year.⁵

Total agricultural employment was unaffected by the definition change. The number of persons employed primarily in agriculture in 1979 was 3,297,000, now about equally divided between farm and nonfarm residents. However, persons self-employed in agriculture—farm operators—are mainly farm residents. Of the 1,642,000 self-employed agricultural workers, 1.1 million, or two-thirds, lived on farms. The rest lived in town or in open-country nonfarm homes. Agricultural laborers were more likely to live off the farm and commute to work. There were 1,413,000 agricultural wage and salary workers employed primarily in agriculture in 1979;

⁵ The estimate of the 1979 farm population based on the previous definition of a farm (rural areas or places of 10 acres or more with at least \$50 worth of agricultural sales per year or places of less than 10 acres with at least \$250 worth of sales per year) is 7.5 million. All persons reclassified as nonfarm under the new definition were on places with farm product sales under \$1,000.

Figure 1

Farm population



Source: U.S. Department of Agriculture and Department of Commerce.

only about a fourth of these lived on a farm.⁶ Most unpaid farm family workers, who numbered about 390,000, resided on farms.

Farm residence was once strongly associated with farm employment but this is no longer the case. Today, farm people are almost as likely to work in nonagricultural industries as

to work on the farm. Of the 3.3 million farm residents in the work force in 1978, 44 percent were not employed in agriculture. However, more farm females than males work in nonagricultural industries. In 1978, about 7 out of 10 employed farm females were engaged solely or primarily in non-agricultural pursuits; among farm resident males only 4 out of 10 were so employed.

⁶ Another widely quoted estimate (the Hired Farm Working Force Survey, 1979—no survey was conducted in 1978) of the hired farm labor work force is 2.7 million. This estimate is the total number of people who worked at least 1 day on a farm during 1979. The estimate of 1,413,000 is an average of quarterly estimates of people who list agricultural work as their primary occupation. Neither estimate accounts for undocumented aliens, variously estimated to number as high as 1 million workers.

This examination of the population characteristics of rural America and the farm sector leads to some summary observations.

- The total population of the country has almost doubled since 1920. But within this growth setting, the rural population has remained relatively constant in absolute num-

Table 4—Selected population characteristics, 1920-79

Year	Total resident population ¹	Rural population ²	Farm population ³	Total agricultural employment ⁴	Agricultural wage and salary workers ⁵
<i>Thousands</i>					
Current definition:					
1979	220,099	55,000 (est.)	6,241	3,297	1,413
1978	218,228	55,000 (est.)	6,501	3,342	1,418
Previous definition:					
1979	220,099	55,000 (est.)	7,553	3,297	1,413
1978	218,228	55,000 (est.)	8,005	3,342	1,418
1977	216,400	NA	7,806	3,244	1,330
1976	214,680	NA	8,253	3,297	1,318
1975	213,051	NA	8,864	3,380	1,280
1974	211,389	NA	9,264	3,492	1,349
1973	209,859	NA	9,472	3,452	1,254
1972	208,219	NA	9,610	3,452	1,216
1971	206,219	NA	9,425	3,387	1,161
1970	203,810	53,887	9,712	3,462	1,152
1960	179,323	54,054	15,635	5,458*	1,762
1950	151,326	54,479	23,048	7,160	1,630
1940	132,166*	57,459	30,547	NA	NA
1930	122,755	54,042	30,529	NA	NA
1920	105,711	51,553	31,974	NA	NA

*Denotes first year Hawaii and Alaska included in the data.

NA = Not available.

¹ Estimate as of July 1 each year.

² Persons outside urban areas in open country, on farms, and in places with a population less than 2,500.

³ Current definition: Persons on places with at least \$1,000 of agricultural sales. Previous definition: Since 1960, persons on places of 10 acres with at least \$250 of agricultural sales. Prior to 1960, farm residence was based essentially on self-identification of the respondent.

⁴ Sole or primary agricultural employment of persons 16 years old and older. The data are not strictly comparable over time because of definitional changes. Data are annual averages.

⁵ Persons 16 years old and older.

Sources: U.S. Department of Agriculture, Bureau of the Census, Decennial Census of Population and Current Population Reports; U.S. Dept. Labor, Bur. Labor Stat.

bers (at 54 to 55 million) in the last several decades. As a proportion of the total population, however, it has declined from about 45 percent to about 25 percent today.

- The farm population, a subset of the rural population, has declined by 80 percent over the six decades. That is, for every 10 people in the farm population in 1920, there are only 2 today.
- The total agricultural labor force (regardless of residence) has declined by 60 percent, the largest decline being among self-employed owner operators. The hired farm-workers (a subset of the total agricultural work force) has declined since 1950 by about 13 percent, but was relatively stable in the seventies, actually increasing slightly from the low point recorded in 1970.
- Outmigration of people from agriculture over the past 50 years was tremendous, very clearly emphasizing that farm sector earnings are distributed among a much smaller number of people today. This fact has implications for per capita income comparisons across sectors of the economy.

We can see, then, that the farm sector is in a rural setting so amorphous and heterogeneous that it severely limits generalized description: some farmers live in town, some people employed in the nonfarm sector live on farms, farm household members often have nonagricultural employment, and the like. Such conditions are far different from the once much more easily identified group of farm people whose well-being was the objective of a major element of our national public policy.

Agricultural Productivity

Technological innovations and their adoption in the United States released large numbers of people from farming. Growth in the nonfarm economy was at most times sufficient to ensure their rapid absorption. It was this transition—this emergence of excess labor in agriculture and its eventual reabsorption elsewhere in the economy—that formed the basis for the “farm problem” that endured for several decades. This “labor pool” was an important source of aggregate growth in the nonfarm economy; labor with low value in agriculture shifted to higher valued endeavors.

Another perspective on this resource displacement is provided by reviewing the use of labor and other resources and the measures of productivity change in the farm sector (table 5). Total inputs committed to agricultural production have increased only slightly (10.2 percent) since 1920. Yet, the composition (and undoubtedly the quality) of those

inputs has changed markedly. The amount of land has declined only slightly (5.9 percent), but the substitution of capital (machinery and equipment) for labor has been dramatic, making agriculture today one of the most capital intensive sectors of the economy.

The total output obtained with the near constant total input bundle has, of course, increased significantly (152.9 percent) since 1920. Total factor productivity (changes in output obtained from all inputs) has risen by 128.8 percent since 1920, an annual average increase of 2.18 percent (that is, on average, 2.18 percent more output obtained each year with an equivalent amount of inputs). For the almost 60 years considered here, the increase by decade in total factor productivity was:

<i>Decade</i>	<i>Percentage increase</i>
1920-29	0
1930-39	15.7
1940-49	18.3
1950-59	22.5
1960-69	14.4
1970-79	16.7

The rate of productivity growth for two of the major inputs, land and labor, presents an interesting picture. The productivity of land, measured as crop production per acre, more than doubled (rising by 113.1 percent) from the twenties through the seventies, increasing most rapidly in the fifties.

Labor productivity rose by a phenomenal 1,314 percent, an average of 22.3 percent per year. This rapid rate of growth would be expected in a labor surplus sector with the surplus outmigrating, and that sector also experiencing extensive technological innovation, as was agriculture. The influx of large amounts of capital with labor emigrating (the capital-labor substitution) was making the remaining labor more productive. Labor productivity grew somewhat in accordance with the emigration of people, generally rising most rapidly when the emigration was most rapid (fig. 2 and table 6). As the labor emigration slows and concludes, the rate of productivity increase will likely slow.

Whether total productivity growth in agriculture is slowing perceptibly is a subject of some controversy. The inability to isolate weather effects and the crudeness of current productivity measures, owing to definitional, procedural, and data limitations, preclude definitive judgments. However, if the rate of productivity growth is indeed slowing and with the readily available land resource (the other source of increased output) largely committed, the prospects for future output expansion are not bright, without a major breakthrough in production technology. This is a time when global food de-

Table 5—Index measures of resource use, output, and farm productivity, 1920-78

Year	All inputs	Selected inputs			Output			Productivity (ratio of output to input)		
		Labor	Real estate	Mechanical power and machinery	Livestock	Crops	Total	All inputs	Land ¹	Labor
1967 = 100										
1920	98	341	102	31	44	65	51	52	61	14
1930	101	326	101	39	54	59	52	51	53	16
1940	100	293	103	42	60	67	60	60	62	20
1950	104	217	105	84	75	76	74	71	69	34
1960	101	145	100	97	87	93	91	90	89	65
1970	100	89	101	100	105	100	101	102	104	115
1971	100	86	99	102	106	112	110	110	112	128
1972	100	82	98	101	107	113	110	110	115	136
1973	101	80	97	105	105	119	112	111	116	130
1974	100	78	95	109	106	110	106	105	104	136
1975	100	76	96	113	101	121	114	115	112	152
1976	103	73	97	117	105	121	117	115	111	162
1977	105	71	99	120	106	130	121	114	117	173
1978	105	67	97	125	106	131	122	116	121	182
1979	108	66	96	129	110	144	129	119	130	198

¹ Measured as crop production per acre.

Source: *Changes in Farm Production and Efficiency, 1978*, SB-628, U.S. Dept. Agr., Econ. Stat. Coop. Serv.

mand increases and growing demand for U.S. exports are quite likely.

The Farms and Their Characteristics

Perhaps the best-known characteristic of the farm sector is that the total number of farms over time has declined and the average size has increased (fig. 3). This change has been the most visible manifestation of forces affecting the farm sector: the technological innovations presenting economic efficiencies that could be attained only by farms growing larger, the resulting excess labor, and its emigration. The decline in total farm numbers is also the most likely statistic to be used in discussions of general policy issues such as the status of the family farm. Yet, this statistic, while making a point about what has occurred, conceals much more than it reveals about the farm sector today. This section attempts to look behind the total numbers to the sizes, types, locations, and income and wealth characteristics of today's farms.

Any discussion of farm numbers and sizes today is importantly conditioned by definitions, perhaps more so than when there were several million farms regardless of how defined. The most widely used source of farm numbers is the

quinquennial agricultural census of the Department of Commerce. The census reports two definitions of a farm, the official one (noted previously) adopted in 1978 and the former one, continued in use for continuity of the data series. (The old definition is used here because it is more consistent with other data presented. The most recently available comprehensive estimates are from the 1974 Census; complete data from the 1978 Census had not been released when this article was written.)

The other source of farm numbers is the Department of Agriculture. These estimates are derived using the Census counts as benchmarks for extrapolation with modifications as suggested by other information.⁷ The Department's estimates for 1978 are shown in table 7.

⁷ The enumeration procedures used in the 1974 Census of Agriculture did not completely count all farms, primarily missing small farms. To account for any discrepancies, a census survey on the completeness of the enumeration was made along with the actual census. Some time after the census data were released, adjustment percentages are made available to account for any differences between the reported census numbers and what are believed to be the "actual" numbers. USDA then uses the adjustment percentages to recalculate the census numbers for publications such as *Farm Income Statistics* and *The Balance Sheet of Agriculture*. (Not all USDA publications use the adjusted estimates.)

Figure 2

Labor productivity increases

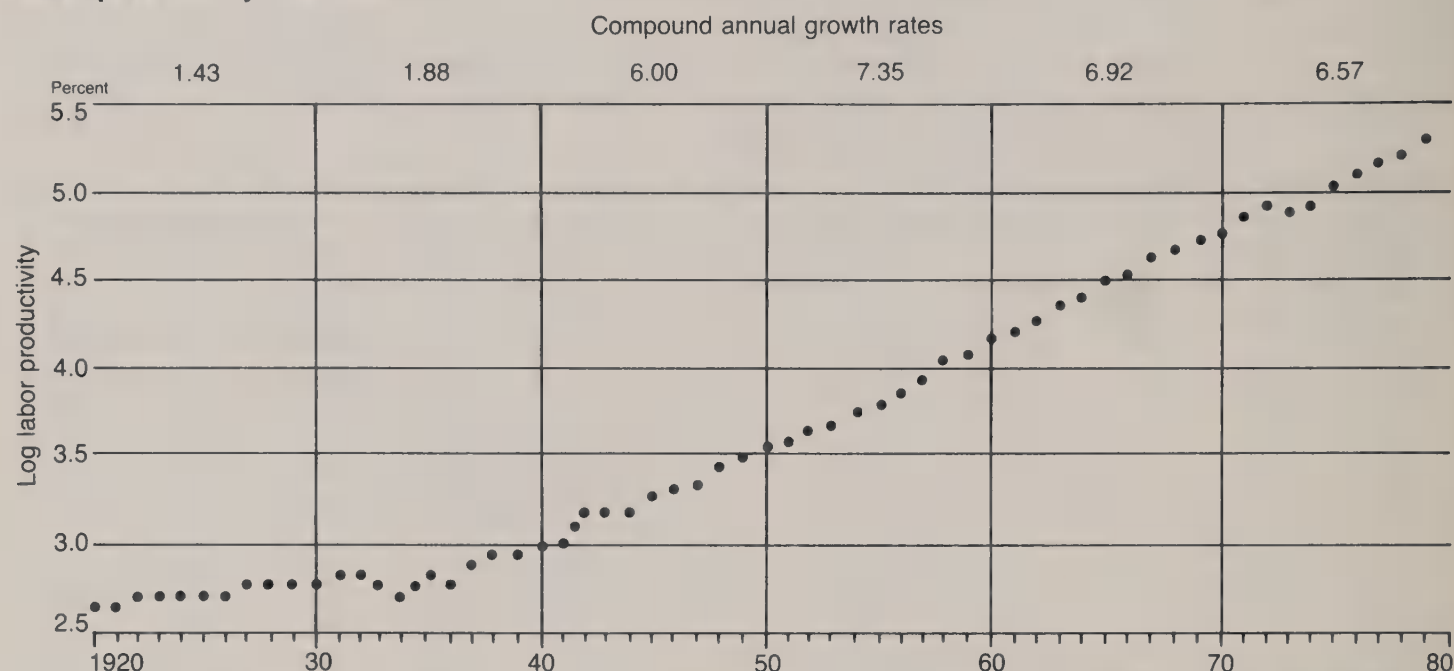


Table 6—Average annual productivity growth in agriculture, 1920-79

Period	All factors	Land	Labor
<i>Percent</i>			
1920-29	0	-0.82	1.43
1930-39	1.57	1.32	1.88
1940-49	1.83	1.29	6.00
1950-59	2.25	2.32	7.35
1960-69	1.44	1.91	6.92
1970-79	1.67	2.50	7.22

The new definition of a farm is more restrictive, counting a place as a farm only if it has product sales of \$1,000 or more, regardless of acre size. This definitional change affects only the number of farms in the smallest sized category (sales less than \$2,500); the number in this category is reduced by about 302,000 (to 609,000), reducing the total number of farms in 1978 to 2,370,000. Thus, the total number of farms in the United States is 2.672 million or 2.370 million depending on the definition used.

The size distribution of these farms reveals additional insight into their characteristics. Shown by value of sales (economic

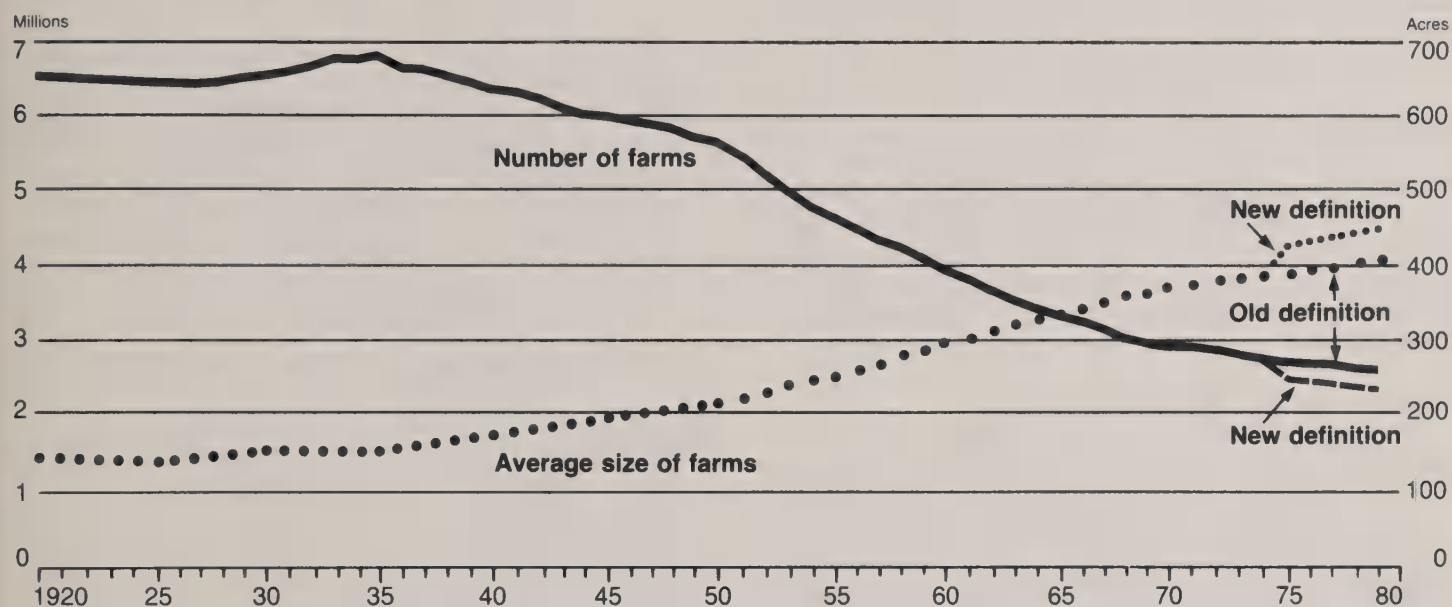
class), the distribution is far from "normal" (an equal proportion of farms of varying sizes both above and below the mean size). It is, in fact, highly skewed toward the smaller sizes; there are many more farms below the mean size than above it.

The profile becomes clearer when we add the contribution of farms in each size category to the total value of all food and fiber production: the numerous smaller farms contribute proportionally much less to total output (table 7). For example, farms below \$10,000 in sales constitute 54.9 percent of all farms, yet they contribute only 4.2 percent of the total sales. Farms with under \$40,000 in gross sales are 78.0 percent of all farms but account for only 18.3 percent of total sales. Conversely, farms selling over \$40,000 are only 22.0 percent of all farms but account for 81.7 percent of gross sales. Further, the largest farms, those having gross sales in excess of \$200,000, comprise only 2.4 percent of the total but produce 39.4 percent of the total sales.

The concentration of production among the larger farms is obvious. These data also suggest that there would be many economically disadvantaged farm families (and many below the poverty criterion) on the smaller farms if farming were

Figure 3

Number and average size of farms



Sources: Average size of farms 1920-50 from 1964 Census of Agriculture. All other data from Crop Reporting Board, USDA.

Table 7—Number of farms and off-farm income by value of sales, 1978

Farm size by value of sales	Farms		Value of sales		Off-farm income	
	<i>Thou.</i>	<i>Percent</i>	<i>Mil. dols.</i>	<i>Percent</i>	<i>Mil. dols.</i>	<i>Percent</i>
Less than \$2,500	911	34.1	1,056	0.9	15,674	45.4
\$2,500-\$4,999	275	10.3	1,270	1.1	4,486	13.0
\$5,000-\$9,999	281	10.5	2,579	2.2	3,846	11.1
\$10,000-\$19,999	294	11.0	5,219	4.4	3,126	9.1
\$20,000-\$39,999	323	12.1	11,405	9.7	2,551	7.4
\$40,000-\$99,999	398	14.9	29,556	25.2	2,762	8.0
\$100,000-\$199,999	126	4.7	20,025	17.1	1,253	3.6
Over \$200,000	64	2.4	46,275	39.4	801	2.3
Total	2,672	100.0	117,385	100.0	34,499	100.0

Source: *Farm Income Statistics*, U.S. Dept. Agr., Econ. Stat. Coop. Serv., 1979.

the sole or even the primary source of income. A farm that grosses only \$40,000, even with the best of management, is unlikely to provide a net income to the operator and family that would be considered adequate today (certainly not near the national median income). On many of the smaller farms, however, the income is supplemented by a larger amount of income from nonfarm sources.

Since a central consideration to farm policy has traditionally been the level of incomes in the farm sector, that question merits further examination from two views: that of the economic well-being of farm people and the sustained economic viability of farm businesses. Are total incomes of farm people below a socially acceptable norm? Are the rates of return to investments in farm businesses sufficient for continued viability (survival)?

The Economic Well-Being of Farm People⁸

It is now widely recognized that examining only the average income of farm operator families from farm sources gives a misleading indication of the well-being of farm families (6). The significant incidence of off-farm income earned by farm families is a relatively new phenomenon, having grown rapidly

in the last two decades (table 8). Off-farm income is of greater importance to the smaller farms, exceeding farm income by several times over for farms with sales under \$20,000.

Off-farm income declines as a proportion of farm income as the size of farm increases; it declines from being 10 times greater than farm income for the smallest farms to only one-fifth of farm income for the largest farms during 1975-78. Today, in the aggregate, nonfarm income earned by farm families exceeds their net earnings from farming. Including income from all sources, the average income per farm operator family in 1978 was almost \$24,000, 36 percent more than national median family income.

The addition of nonfarm income has contributed to a much more equal distribution of total income among farm families, narrowing the income disparity considerably (fig. 4). This also emphasizes the close link of the economic well-being of a majority of farm families to the nonfarm economy, a linkage growing stronger over time. When total income is compared with median income of the total population, only two size categories of farms are slightly below. These size categories are somewhat "in between," neither totally reliant on off-farm income nor large enough to achieve comparable farm incomes.

Sources of the nonfarm income for smaller farms could be especially revealing for policy purposes if they provided insights into the motivation of people living there. Are many of these small farms really rural residences only? Is income from wages or salaries earned by the household head in an occupation other than farming? Or do other family members earn this income in supplementary employment? Unfortunately, little information on such questions is now available. (Surveys are currently being conducted to provide data on the occupational status and income composition of farm families.) However, some insights can be gained from studies with data from varying time periods. One study of family income in 1973 focused on the level, sources, and distribution of income for four groups of farm families (3):

- Low-income farm operator households.
- Households associated with small farms.
- Households dependent solely on farming.
- Households dependent primarily on off-farm income.

The findings revealed:

- Only 1 in 12 farm families depended entirely on farming for their income in 1973; 9 in 12 had income from wages and salaries, the most important source of nonfarm income. Generally, as total family income rose, the portion from wages and salaries rose, except at the highest income levels.

Table 8—Off-farm income per farm operator family as a percentage of net farm income, 1960-78

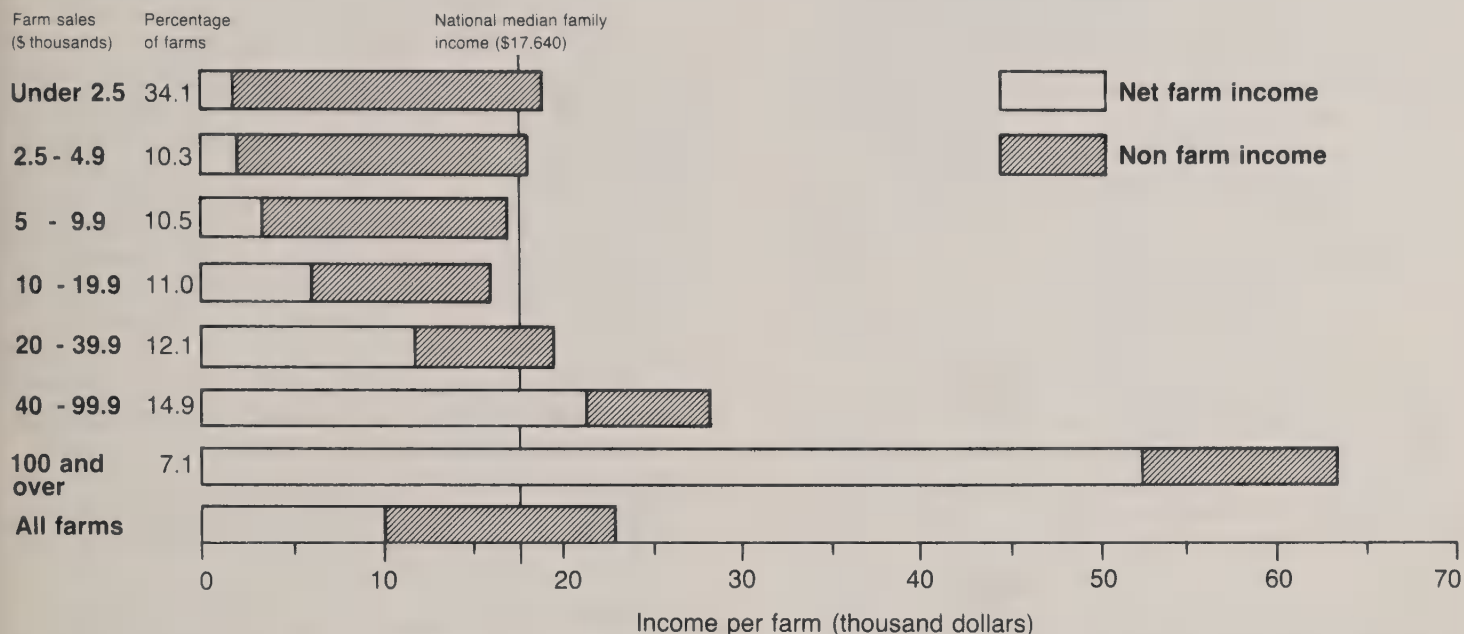
Farm sales	1960-64	1965-69	1970-74	1975-78
	<i>Percent</i>			
Less than \$2,500	408	646	857	1,006
\$2,500-\$4,999	128	261	472	902
\$5,000-\$9,999	68	130	217	423
\$10,000-\$19,999	31	54	91	174
\$20,000-\$39,999	24	30	38	66
\$40,000 and over	17	22	17	25
\$40,000-\$99,999	NA	23	21	30
\$100,000 and over	NA	20	14	21
All farms	89	115	104	141

NA = Not available.

Source: Adapted from *Farm Income Statistics*, U.S. Dept. Agr., Econ. Stat. Coop. Serv.

Figure 4

Income per farm family, by farm sales, 1978



- Farm families reporting farm profits averaged significantly higher total incomes than families reporting farm losses. Farm losses reported were small, and frequently reported by younger operators who had higher wage and salary earnings, and less total income from nonwork sources (dividends, rents, and royalties). The most frequently reported sources of off-farm income were wages and salaries, nonfarm business returns, pensions (including Social Security payments), unemployment compensation, private pensions, welfare payments, and investment income (interest, rents, royalties).
- Regional disparities in incomes were associated with non-farm job opportunities and farm household characteristics. Most low-income farm families were in the South and associated with the older farm households. The absence of a full-time wage earner in the household contributed to the low-income problem. Farm-income-only households had a much higher probability of being in the low-income category than did households reporting income from both farm and nonfarm sources.
- Small farms and low-income households are not synonymous. Low farm income may contribute to low household income, but except for farm-income-only households, it is not the sole cause of poverty.

- The average farm product sales of families with only farm income were almost four times as great as those of families with farm and nonfarm income. The farm-income-only operator was younger and had a slightly larger family than did operators with both farm and nonfarm income.
- About 10.6 percent of the farm families (301,000) were below the poverty threshold in 1973 (compared with roughly 14 percent of the total population), with the greatest concentration in the South.

Total income for all farm size categories, and notably the smaller sizes, compared favorably with incomes earned elsewhere in the economy. From examining average total annual (current) income per farm for the sector as a whole, one must conclude that incomes of farm people are no longer low by any reasonable standard. This does not mean there are no farm families with low incomes nor that there is not considerable poverty remaining (according to Crecink (3)). But low income and poverty seem associated with particular circumstances and geographic regions, and are not pervasive across the entire farm sector as was once the case.

While policies designed to improve farm income would benefit all farm operators to varying extents, the benefits and

impacts on household income would vary directly according to the reliance of the household upon farm income, and to the size of the farm operation.

Policies to enhance farm incomes are of little benefit to the 1.8 million farms (65.9 percent of all farms) with sales of less than \$20,000. This is borne out by studies of the distribution of farm program benefits which reveal that the greatest proportion of the benefits accrue to the larger farmers, those with the greatest volume of production, hence greatest farm income. For example, direct payments made in 1978 under the commodity programs were distributed as shown in table 9.

Table 9—Distribution of commodity program payments, by commodity, 1978

Commodity	Payments received by—			Number
	Smallest 50 percent of farmers ¹	Largest 50 percent of farmers	Largest 10 percent of farmers	
	-----Percent-----			
Wheat	10.9	89.1	50.5	38,734
Cotton	6.2	93.8	53.3	5,045
Rice	7.0	93.0	39.8	1,658
Feed grain	13.3	86.7	39.5	62,037
Total	9.7	90.3	46.0	73,635

¹ Producers were arrayed by the size of their normal cropland acreage (NCA—determined for program purposes). The “smallest 50 percent of farmers” thus means the 50 percent of farmers with the smallest NCA's.

Source (8).

The Economic Viability of Farm Businesses

The last section examined income in the sense of well-being of farm people—but what about well-being of the farm business in an economic sense? That is, what are the earnings of resources productively employed by farm businesses?

In economic parlance, a business firm is viable over the long run if it generates enough income to pay all the factors of production employed (land, labor, capital, and management) and earns a rate of return sufficient to hold them in the particular business endeavor. Alternatively stated, the rate of return must be comparable to rates that could be earned elsewhere or (under certain assumptions, such as complete factor mobility) they will move to another endeavor where the return is greater. This shift is precisely what happened in agriculture. For several decades, agriculture's annual income was insufficient when distributed among all resources to provide returns comparable to those earned elsewhere. A “low” rate of return resulted, and the excess resources gradually shifted to other sectors of the economy where the earnings were greater. But, with the assertions that the farm sector is in relative resource equilibrium today, how do earnings compare with the nonfarm sector?

Rate of Return for the Farm Sector. Several inferences may be drawn from estimates, going back to 1940, of the rate of the return to equity (current market value of assets less the outstanding debt) in agricultural production assets from current income (gross receipts less production expenses including interest paid and operator and family labor and asset appreciation) (table 10).

Table 10—Returns to investment equity in farm production assets, selected periods, 1940-1979

Period	Equity in assets	Residual income to equity	Real capital gains	Rate of return to equity investment from—		
				Current income	Capital gains	Total
	-----Billion dollars (1967)-----			-----Percent-----		
1940-44	81.3	6.3	6.2	7.8	7.4	15.2
1945-49	115.8	8.3	1.1	7.2	1.0	8.2
1950-54	133.1	6.4	.8	4.9	.8	5.7
1955-59	144.5	4.1	6.9	2.8	4.8	7.7
1960-64	161.8	5.3	5.0	3.3	3.1	6.4
1965-69	178.3	7.3	5.4	4.1	3.1	7.2
1970-74	192.0	11.8	13.2	6.1	7.0	13.1
1975-79	241.4	8.8	19.6	3.7	8.2	11.9

Note: Farm production assets are valued at current market prices deflated to a constant dollar basis. Residual income to equity equals income to production assets minus interest on real estate and non-real estate debt.

Source: Data from *Balance Sheet of the Farming Sector* (1979 supplement), AIB-430, U.S. Dept. Agr., Econ. Stat. Coop. Serv., Feb. 1980.

- Higher returns in the form of current incomes during the forties reflected the high commodity prices resulting from wartime conditions. Total returns were relatively stable through the fifties and sixties. The seventies boom is reflected in both current income and capital returns.
- The return in the form of capital gains reflects increases in the value of the largest production asset, land. These returns were relatively stable through the immediate post-World War II decade and the sixties, but then increased rapidly, reflecting the rapid escalation in land prices that began after 1972.
- The average total return to equity is appreciably higher for the seventies than in the previous three decades (excluding the war years of the early forties).

When discussing rates of return to the farm sector and including increases in asset values (capital gains), objections are always certain to arise. The objections, in essence, are that the capital gains are unrealized (they are nonliquid wealth—the increase cannot be captured without selling the asset). In the case of land, this is an unreasonable action for one wishing to continue operating a farm business. However, the capital gains can be converted to cash by borrowing against them for farm expansion.

The inappropriateness of adding the rate of return from current income with the rate of return from nominal capital

gains has been pointed out by Melichar (11) and others. However, they have also overcome this objection by calculating the real return from asset appreciation (capital gains) which is comparable with net income. Real capital gains (the increase in wealth after adjusting for inflation) represent the amount of increase in the wealth of the farm business that could be taken out without reducing the real wealth position, the viability (proportion of equity) of the business. Thus, real increases in asset values are no less a return to farming than current income.

Total returns to agriculture increased appreciably in the seventies. Yet, this information tells us little about relative resource equilibrium unless we can compare with earnings elsewhere in the economy. Such comparisons have limitations, but some useful insights can be gained.

Current income and capital gains returns to common stock and long-term Government bonds are usually viewed as representative earnings in the nonfarm economy. Estimates of returns of stocks and bonds compared with estimates of farm sector earnings permit some interesting observations (table 11; and again recognizing that the three types of returns are not strictly comparable):

- Rates of return to current income among all three investments do not differ greatly over the entire 30-year period, and especially in the past 15 years. Long-term bonds consistently but not greatly outperformed the

Table 11—Rates of return to stocks, bonds, and farm assets, selected periods, 1950-79¹

Period	Current income			Real capital gains			Total		
	Common stock	Long-term bonds	Farm assets	Common stock	Long-term bonds	Farm assets	Common stock	Long-term bonds	Farm assets
	<i>Percent</i>								
1950-54	5.85	2.61	4.95	11.95	- 1.69	3.28	17.53	0.92	8.23
1955-59	3.94	3.38	3.18	13.12	- 4.65	4.02	17.06	-1.27	7.19
1960-64	3.20	4.00	3.61	7.45	- 1.49	2.42	10.65	2.51	6.02
1965-69	3.18	5.01	4.46	1.61	- 9.09	2.48	4.79	-4.08	6.94
1970-74	3.47	6.25	6.26	-8.66	- 8.65	6.15	-5.19	-2.40	12.41
1975-79	4.68	7.49	4.50	-4.09	-12.06	5.10	.59	-4.57	9.60
Coef. of variation ²	22	26	34	281	192	106	152	185	60

¹ The farm asset returns in this table differ from those in table 10 because the estimates in this table are based on total value of assets while those in table 10 are based on owner equity in those assets. Data on owner equity were not available for stocks and bonds, hence it was not possible to compare returns to equity.

² The coefficient of variation is the standard deviation of the data series divided by the mean and expressed as a percent. The higher the number, the greater is the variability.

Source: Stock and bond returns were adapted from David A. Lins, "Financial Performance and Economic Well-Being of the Farm Sector and Rural People," (mimeo) U.S. Dept. Agr., Econ. Stat. Coop. Serv. Farm asset returns were calculated from data in annual issues of *Farm Income Statistics*, U.S. Dept. Agr., Econ. Stat. Coop. Serv.

other two. Judged by the coefficient of variation, farm income is the most volatile of the three.

- Capital gains returns to equity are greater for stocks and farm assets than for long-term bonds. Stocks outperformed farm assets in the fifties and sixties, but the reverse occurred in the seventies. Interestingly, farm capital gains returns are much more stable than returns to the other two.
- During the past 15 years, rates of total returns to farm investment equity have substantially exceeded investments in common stocks and bonds. Although annual farm income is the most variable, it is more than offset by the less variable capital gains returns. Thus, variability (risk) in the farm investment has been substantially lower than investment in the other two.

Overall, these data suggest that, to the extent that stocks and bonds are good proxies for both current income and capital gains returns, the agricultural sector lagged until the late sixties but now enjoys comparable or superior rates of earnings.

These data also suggest that the earnings performance of agricultural land investment could have major implications in the future. Rising land prices are frequently accused of disenfranchising younger and lower equity farmers from the market and of concentrating the land purchases among the more established farmers who can withstand a negative cash

flow (by supplementing farm income with other income sources) in order to realize the capital gains later. This, of course, holds their savings together in real terms and provides a net surplus. However, it is not only just farmers who seek to hold together their savings. The largest single source of savings in this country is pension funds, which have recently been badly battered, in real terms, by inflation. A Midwest group planning to invest pension funds in farmland has been the subject of recent press attention and a congressional hearing. If there are more such efforts in the future, as seems likely, they could become a major economic factor in the coming decade, as all sorts of groups outside the farm establishment seek to realize the kinds of capital gains from assets enjoyed in the past decade. Such an influx of nonfarm capital into the farm sector could be a major factor in determining how future policy would work. This would mean that not only young farmers will have difficulty in buying land, but older farmers as well will meet increased competition from bidders with large amounts of capital to invest.

Useful additional detail for a farm profile would be estimates of rates of return by size of farm. Unfortunately, the only such data available are now over a decade old (table 12).⁹

These data show that smaller farms had negative returns to investment equity. They did so because their net income became negative after subtracting from the gross income an imputed return for operator and family labor and management. The returns increase as farm size increases. By the time a farm reaches \$20,000 of gross sales, the total return appears generally comparable to that in the nonfarm sector. One could reasonably expect that the patterns will be reconfirmed by the 1979 data. Inflation and farm size adjustments, however, will probably push up the gross sales to greater than \$40,000 to achieve rates of returns comparable with those in the nonfarm sector.

Income and Returns Variability. Two important facets to rates of return from annual income and asset appreciation are the amount and the variability of the rate of return. Total income to farm families in recent years compares favorably with the national median family income. The total rate of return to investment in farm businesses since about 1970 compares favorably with rates of return in the nonfarm economy. But, what about the variability or stability of current income and investment earnings?

Some insights are obtained by measuring the variability in commodity group prices and incomes for three periods (table 13):

⁹ That information was obtained for 1970 from a special survey by the Census of Agriculture. A similar survey was conducted for 1979 as a follow-on to the 1978 census but the data are not yet available. However, it is unlikely that the general pattern of earnings changed significantly.

Table 12—Returns to investment equity in farm production assets by size of farm, 1970

Sales class size	Average investment equity	Rate of return		
		Current income	Capital gains	Total
	<i>Dollars</i>	<i>-----Percent-----</i>		
Less than \$2,500	22,208	-6.1	3.7	-2.4
\$2,500-4,999	38,898	-6.5	3.9	-2.6
\$5,000-9,999	55,058	-.1	4.2	4.1
\$10,000-19,999	84,489	2.9	4.4	7.3
\$20,000-39,999	128,345	4.4	4.5	8.9
\$40,000-99,999	201,493	5.9	4.7	10.6
\$100,000 and over	522,027	6.9	4.3	11.2
All farms	69,736	2.1	4.3	6.4
All but smallest class	100,294	3.3	4.4	7.7

Note: The capital gains estimates are nominal, not real, unlike the estimates in the previous tables, which are in real terms.

Source: Adapted from J. Bruce Hottel and Robert D. Reinsel, *Returns to Equity Capital by Economic Class of Farm*, AER-347, U.S. Dept. Agr., Econ. Res. Serv., Aug. 1976.

Table 13—Variation in farm income and product prices, selected periods, 1950-78

Item	Coefficient of variation ¹		
	1955-63	1964-71	1972-78
	<i>Percent</i>		
Index of prices received:			
All products	2.6	5.9	14.6
Crops	2.9	3.8	18.9
Livestock	5.5	11.3	13.7
Cash receipts:			
Crops	10.4	9.1	20.6
Livestock	8.3	14.6	15.7
Personal income received by the farm population:			
Farm income less			
Government payments	9.4	18.6	24.3
Farm income	6.3	14.1	21.7
Nonfarm income	12.5	16.0	15.7
All sources	5.5	12.1	13.9

¹ The coefficient of variation is the standard deviation of the data series divided by the mean and expressed as a percent.

- The periods of 1955-63 and 1964-71 were stable relative to 1972-78: variability in prices received for all products increased sixfold, over sixfold for crop prices, and over twofold for livestock prices. The variability in cash receipts from crops increased over twofold.
- The variability in farm income was over three times as great in the seventies as in 1955-63. Income variability in all periods is reduced by Government payments, and reduced further when income from nonfarm sources is included.
- Nonfarm income received by the farm population was relatively stable in all three periods, primarily reflecting economic conditions in the nonfarm economy.

Overall, these estimates confirm that farm income variability has increased for the entire sector in recent years.

Analyzing the distribution of income to the farm operator families by source and by size of farm for the sixties and the seventies allows one to look beyond sector aggregates (table 14):

- Variability in farm income increased substantially for farms of all sizes in the seventies over the sixties.

- Farm income varies significantly more for farms with over \$40,000 in gross sales than for those with less gross sales. This difference is due to the larger proportion of total income from farm sources for the larger farms.
- Total income is less variable than farm income alone because adding nonfarm income reduces variability for all sales class sizes.
- For farms under \$20,000 in gross sales, total income was highly stable. As this income is mainly from wages and salaries, household incomes on these farms are little affected by farm income variability.

Overall, income varied more in the seventies than in the sixties. Furthermore, since farm income is proportionally a smaller part of total income on small farms than it is on large farms, small farms are less affected by fluctuations in farm earnings.

The implications of this increased economic instability in the farm sector are perhaps more significant today than in previous times, when farm families were thought to be very resilient. During periods of adverse economic conditions, they "tightened their belts," reduced personal consumption expenditures, and weathered the period until conditions improved. They were much less dependent on purchased inputs from the nonfarm sector and their fixed annual cash obligations were relatively small. Today, however, farmers purchase a high proportion of annual production inputs and many have substantial annual debt repayment obligations for their fixed assets (machinery and land).

Table 14—Variability in farm income per farm operator family by size of farm, selected periods, 1960-78

Sales class	Coefficient of variation			
	Net farm income		Total income	
	1960-72	1973-78	1960-72	1973-78
	<i>Percent</i>			
Less than \$2,500	8.5	10.8	33.2	15.6
\$2,500-\$4,999	6.9	16.2	30.6	14.6
\$5,000-\$9,999	4.4	16.0	23.9	12.2
\$10,000-\$19,999	6.8	15.7	18.9	7.3
\$20,000-\$39,999	11.9	13.7	15.0	7.7
\$40,000-\$99,999	12.9	15.2	¹ 8.6	10.7
\$100,000 and over	19.6	32.0	¹ 16.3	26.5

¹ For 1965-72.

Source: *Farm Income Statistics*, U.S. Dept. Agr., Econ. Stat. Coop. Serv.

For example, the ratio of cash production expenses to gross farm income has trended upward since World War II (table 15). The increased reliance on purchased inputs and borrowed capital varies by farm size, and the ratio is much higher for the larger farms. Likewise, the debt-to-asset ratio is much higher for the larger farms, which shows the added cash requirement for annual debt servicing (table 16). This has important implications for the cash flow situation of the primary farms (those producing most of the food and fiber—discussed in the next section).

The implications of an increasing ratio of cash production expenses to gross receipts are illustrated by the effects it has on variation in net income (table 17). A given increase in production expenses (or reduction in cash receipts) is much

more severe the greater the dependence on purchased inputs (the higher the ratio). The import of this is that more and more farms are vulnerable at a time when the increased dependence on foreign markets means greater potential variability in market prices, hence variability in cash receipts.

The "Primary" Farms

The diversity in the contemporary farm sector suggests that future policies will need to be based on more careful identification of problems and targeting of the subgroups of farms that each policy is to treat.

At least two and perhaps three types of farms can be grouped according to some common characteristics. Those whose production is small and whose nonfarm incomes are relatively high may be simply rural residences and hobby farms. At a minimum, the smallest size category (under \$2,500 in sales) would be included, and reasonably the next size category, between \$2,500 and \$5,000, could be included as well. This group, which might be labeled "rural farm residences," encompasses 44.4 percent of all farms today.

A second group (which could be called "small farms") might include the next three sales class categories (\$5,000 to \$40,000 in sales). Most of these farms produce too little product to be able to rely fully or primarily on farming for a livelihood and must depend on supplemental nonfarm income, but to a lesser extent than do the smallest farms.

A third category (called "primary farms"—over \$40,000 in gross sales) depends primarily upon farming and produces most of the Nation's food and fiber.¹⁰ This and perhaps the middle group as well, are the ones of major interest for commodity policy. The primary farms group is now examined in greater detail.

¹⁰ The dollar boundaries on these delineations will change over time. For example, the \$40,000 boundary would shift upward over time, as inflation and technology reduce the real value of that amount of sales.

Table 15—Cash production expenses as a percentage of cash receipts, selected periods, 1935-78

Period	All farms	Farms with gross sales of—		
		Less than \$40,000	\$40,000 to \$100,000	More than \$100,000
<i>Percent</i>				
1935-39	59.8	NA	NA	NA
1940-45	56.3	NA	NA	NA
1946-49	53.4	NA	NA	NA
1950-54	58.7	NA	NA	NA
1955-59	63.2	NA	NA	NA
1960-64	67.1	60.2	71.8	85.6
1965-69	68.5	59.6	69.4	84.8
1970-74	67.4	55.9	63.9	80.6
1975-78	72.1	57.4	63.5	81.3

NA = Not available.

Note: Cash receipts include marketings from livestock and crops, Government payments, and income from recreation, machinery hire, and custom work. Cash expenses include operating expenses, taxes, interest on farm mortgage debt, and rent to nonoperator landlords.

Table 16—Debt to asset ratio, by farm size, selected years, 1960-78

Year	All farms	Farm size						
		Less than \$2,500	\$2,500 to \$4,999	\$5,000 to \$9,999	\$10,000 to \$19,999	\$20,000 to \$39,999	\$40,000 to \$99,999	\$100,000 and over
Percent								
1960-64	13.5	8.1	10.2	12.9	15.0	15.0	15.2	18.8
1965-69	16.3	9.2	9.4	14.4	17.8	17.8	19.2	23.4
1970-74	16.4	5.1	8.8	11.5	15.5	17.8	19.7	24.9
1975-78	16.0	4.7	6.9	7.6	12.2	14.9	18.2	24.9

Source: *Balance Sheet of the Farming Sector*, 1976, 1978, and 1979 Supplement, U.S. Dept. Agr., Econ. Stat. Coop. Serv.

Table 17—Sensitivity of annual net income to changes in production expenses

Item	Production expenses as percentage of cash receipts		
	70%	85%	90%
<i>Dollars</i>			
Gross receipts	100	100	100
Production expenses	70	85	90
Net cash income	30	15	10
10-percent increase in production expenses	77	94	99
Net cash income	23	6	1
<i>Percent</i>			
Decrease in net cash income	23	60	90

The 1974 census counted 476,909 farms with gross sales of at least \$40,000 (such farms were estimated to have increased to 577,000 in 1978). These farms constituted 19.3 percent of all farms and accounted for 78.4 percent of total farm output in 1974. These farms will most likely influence the effectiveness of the commodity programs as now structured, and they will be the largest beneficiaries of the program benefits, so their characteristics are of further interest. What do they produce? How viable are these farm businesses?

The census of agriculture classifies farms by type based on the Standard Industrial Classification (SIC) codes of the Department of Commerce. These codes place a farm in a particular classification according to the commodity that accounts for more than 50 percent of the gross sales of the farm. Thirteen major farm types are delineated by the census (table 18). Of farms grossing over \$40,000 in sales in 1974, livestock farms (including dairy, poultry, animal specialty, and general livestock) accounted for 45.5 percent of the total; crop farms (grains, cotton, sugar, tobacco, and general crop) made up 48.8 percent; and horticultural and various other miscellaneous types constituted the remaining 5.7 percent. Cash grain and cotton farms, those for which the major crop commodity programs have been operated for over half a century, were about 40 percent of this total.

The contribution of total sales by size of farms within each of these types is further revealing (table 19). As expected, production is concentrated; a relatively small number of producers accounts for a much larger proportion of total output. Concentration varies by type from the larger sugar, peanut, and other farms that produce virtually all the product to the tobacco farms, of which the larger farms produce only 44 percent of the output. The larger cash grain farms (38 per-

Table 18—Farms with over \$40,000 in sales, by type, 1974

Type	Farms	
	Number	Percent
Cash grain	179,701	37.7
Cotton	9,500	2.0
Sugar, peanuts, potatoes	22,966	4.8
Dairy	78,083	16.4
Poultry, eggs	32,537	6.8
Horticultural	6,578	1.4
Livestock	100,036	21.0
Tobacco	8,886	1.9
Vegetable and melon	6,000	1.3
Fruit and tree nut	13,769	2.9
General crop farms	11,566	2.4
Animal specialty	1,703	.4
General livestock farms	4,518	.9
Not classified	1,066	.2
Total	476,909	100.0

Source: 1974 Census of Agriculture.

cent of all farms with over \$40,000 sales but only 7.3 percent of all farms) made 74.1 percent of total sales.¹¹

To delineate a set of primary grain farms for analysis of commodity policy, one must identify the specific grain crops produced. The census data do not, however, enable such an identification directly. It must, therefore, be done indirectly, by identifying the major grain producing States by type of grain produced (from census acreage data) and assuming that farms in these States produce these grains. Using this procedure gives 115,394 primary grain farms in the 10 major wheat- and corn-producing States (the remaining 64,000 primary grain farms are spread throughout the Nation):

State	Farms
Wheat:	
Kansas	12,957
North Dakota	10,952
Washington	3,447
Montana	4,209
Oklahoma	3,909
Total	35,474

-- tabulation continues

¹¹ This percentage indicates only that large cash grain farms account for 74.1 percent of the sales of all cash grain farms. We do not know what proportion of the grain they produce or how much grain is produced on other farms. It appears, however, that the grain produced on the farms in this type and produced on farms of other types in this size category is a large proportion of all grain produced.

State	Farms
Corn/soybeans:	
Illinois	26,328
Iowa	23,446
Nebraska	11,513
Indiana	11,271
Ohio	7,362
Total	79,920
Cotton:	
Texas	2,250
California	1,148
Arkansas	933
Arizona	620
Mississippi	1,953
Total	6,934

Having identified these farms, some notion of the nature of these farming operations can be obtained by looking at averages of these farms (table 20; and again recognizing the limitations of averages in the diverse agriculture of today).

Based on census data, current income and capital gains returns were computed and compared with the operator's average equity in the farm business to show the average financial situations of these farms (table 21). Returns varied by State, but total rates of return were comparable with returns in the nonfarm economy for 1974 (see table 13). Likewise, total in-

come (farm and nonfarm) accruing to farm operator families was comparable with the median family income for 1974.

Again, these are average situations. The average amount of operator equity in these farm businesses is large, and cash flow requirements are much less stringent than for a renter or beginning farmer who is more likely to have a much smaller equity.¹²

Economies of Size

The farm size efficiency tradeoff has long been a major argument in farm policy considerations. Conventional wisdom has held that technological advancements over time have created efficiencies that could more effectively be captured by farms growing larger (by substituting machines for labor with the investment cost of the machine per acre or per unit of output being reduced through increasing the farm size up to some point). Further, the cumulative impact is seen as the consolidation of farms and the reduction in unit costs of production. Hence, the cost of food was reduced and consumers benefited. The most frequently cited evidence of these societal benefits was the declining proportion of real disposable income spent by the public for food.

The argument is clearly illustrated in figure 5. In the short run, some factors of production are fixed (cannot be immediately varied); thus, firm (plant) size is fixed. If a firm is of

¹² For additional analyses of how the amount of equity affects cash flow for several typical farming situations, see (19).

Table 19—Distribution of farms and agricultural product sales, by type, 1974

Type of farm ¹	Less than \$40,000 in sales			More than \$40,000 in sales			All farms	
	Number	Percent	Percent of total sales	Number	Percent	Percent of total sales	Number	Total sales \$1,000
Cash grain	400,024	69.0	25.9	179,506	31.0	74.1	579,530	23,548,215
Cotton	18,848	68.6	14.4	8,622	31.4	85.6	27,470	1,724,981
Horticultural	7,130	62.5	8.0	4,286	37.5	92.0	11,416	1,165,140
Livestock	392,059	79.7	19.8	99,800	20.3	80.2	491,859	22,054,665
Dairy	116,777	60.2	27.8	77,084	39.8	72.2	193,861	9,623,312
Poultry and eggs	9,500	23.4	3.3	31,163	76.6	96.7	40,663	5,999,795
Sugar, peanuts, potatoes ²	43,626	66.8	.9	21,641	33.2	99.1	65,267	5,185,796
Tobacco	74,796	89.5	55.8	8,762	10.5	44.2	83,558	1,528,268
Vegetable and melon	4,536	56.2	4.2	3,529	43.8	95.8	8,065	1,564,748
Fruit and tree nut	31,372	71.8	16.9	12,346	28.2	83.1	43,718	2,561,219
General crop farms	15,514	72.4	32.4	5,910	27.6	67.6	21,424	812,808
General livestock farms	2,147	59.1	24.8	1,487	40.9	75.2	3,634	168,656
Total of above	1,116,329	71.1	21.1	454,136	28.9	78.8	1,570,465	75,937,603

¹ Data not available, due to disclosure problems, for animal specialty farms and farms not otherwise classified.

² Includes hay and other field crop farms.

Table 20—Characteristics of cash grain and cotton farms with over \$40,000 in gross sales, 1974 averages

Item	Wheat farms ¹	Corn/soybean farms ¹	Cotton farms ¹
<i>Number</i>			
Farms	35,474	79,920	6,934
<i>Acres</i>			
Land inventory:			
Acres operated	1,728	565	1,254
Cropland acres	1,199	475	982
Acres harvested	802	431	801
Cropland not harvested	397	44	181
Pasture, range, and woodland	490	74	221
Other land	39	16	51
Tenure:			
Acres owned and operated	940	240	635
Acres rented in	839	337	696
Acres rented out	51	12	7
Crop enterprises:			
Wheat	650	40	38
Corn	40	213	4
Soybeans	15	148	109
Other grains	51	11	72
Hay and fieldseeds	52	16	34
Other crops	2	3	10
Cotton	0	0	509
<i>Dollars</i>			
Value of sales:			
Grain	77,414	74,630	30,806
Fieldseeds and hay	1,770	445	8,492
Other field crops	1,629	302	2,538
Vegetables	—	224	2,808
Fruit	—	—	900
Other crops	820	619	134,078
Livestock	10,090	11,865	3,488
Total	91,742	88,093	183,110

— = Insignificant amount.

¹ Farms in the following States: wheat—Kansas, North Dakota, Washington, Montana, Oklahoma; corn/soybeans—Illinois, Iowa, Nebraska, Indiana, Ohio; cotton—Texas, California, Arkansas, Arizona, Mississippi.

Source: 1974 Census of Agriculture.

Table 21—Financial characteristics of cash grain and cotton farms with over \$40,000 in gross sales, 1974 averages

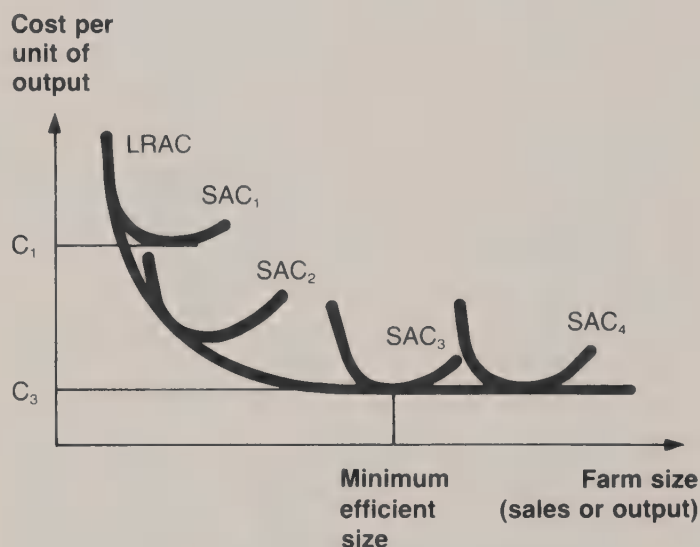
Item	Wheat farms	Corn/soybean farms	Cotton farms
<i>Dollars</i>			
Balance sheet:			
Assets	318,310	255,158	433,180
Debt	37,609	30,555	71,907
Equity	280,701	224,603	361,273
Percent equity	88.2	88.0	83.4
Current income:			
Gross receipts	91,661	88,095	183,111
Total expenses	56,329	53,038	147,899
Net income to equity	35,332	35,057	35,212
Other income:			
Net farm related	1,278	2,759	3,289
Nonfarm	2,708	2,761	4,178
Total	3,986	5,520	7,467
Total income:			
All sources	39,318	40,577	42,679
Farm sources	36,610	37,816	38,501
Real estate asset appreciation	16,582	9,244	-14,967
<i>Percent</i>			
Returns to equity from:			
Annual farm income	13.04	16.84	10.66
Real capital gains	5.91	4.12	-4.14
Total	18.95	20.96	6.52

Source: Calculated from 1974 Census of Agriculture data.

Note: The financial characteristics were determined in the following manner: Gross receipts are equal to total market value of agricultural products sold. Total expenses were calculated by weighting the average variable costs for farms with gross sales of more than \$100,000 with those of farms having gross sales of \$40,000 to \$100,000. Wheat farms were those classified by the Census of Agriculture as cash grain farms in the predominantly wheat-growing States of Kansas, North Dakota, Washington, Montana and Oklahoma; corn/soybean farms were cash grain farms in the predominantly soybean/corn States of Illinois, Iowa, Nebraska, Indiana and Ohio; and cotton farms were listed as cotton farms in Texas, California, Arkansas, Arizona, and Mississippi. Total variable costs include cash rent, taxes, interest, depreciation, as well as the customary cash items. In addition, a management charge, representing 5 percent of total sales, and a labor charge calculated from crop production budgets were included. Returns to equity were calculated by taking the ratio of total income from farm sources to equity and the ratio of real estate asset appreciation to equity.

Figure 5

Economies of size



the size represented by SAC_1 (shortrun average cost), the optimum operating point would be C_1 where unit cost is lowest. But over time, all factors can be varied and the firm could move to the optimum size; it would attempt to reach the size represented by SAC_3 , the optimum longrun firm size with unit costs (C_3) at a minimum. In a competitive economy, product prices would reflect the lower costs (and for agriculture, would ultimately be reflected in lower food prices). There would exist no further cost reduction incentive for a firm to grow beyond the least-cost size—any size growth beyond (say, to SAC_4) would also yield no benefits to society in terms of lower food costs.

Consumers have benefit significantly from the past efficiency gains in the farm sector; the tradeoff between farm numbers and food costs has been decidedly advantageous to consumers. But the question now arises (especially with arguments that the sector is in relative resource equilibrium, if for no other reason) as to whether, given existing technology and relative prices, further significant efficiency gains can be realized from continued consolidation of farms? Is this farm size and food price tradeoff still valid? Have the primary farms realized most of the attainable size economies (are they now operating at or to the right of the minimum on their longrun average cost curves)?

If it is assumed that the sector is in longrun equilibrium and technology is unchanged, there can be no efficiency gains from increasing farm size. However, if the longrun average cost curve is flat, the individual firm can increase its total profit by expanding in size even though there are no efficiency gains and no gains to society. It is important to note that changes in size in the past have not occurred with given technology but with rapidly changing technology. An important question is whether future technological change will continue to induce increased farm size.¹³

Again, any generalizations are severely limiting—each farm situation is different. Moreover, there are conceptual and empirical difficulties with determining size economies (how does one treat operator labor, land, and management costs, for example?), difficulties peculiar to agriculture. For the specific nature of these difficulties and their implications, see Miller (12).

However, current studies are reexamining technical economies of size, and qualified estimates of least-cost farm sizes for seven farming situations have been developed (table 22).¹⁴

These estimates bear out previous studies that show unit costs fall rapidly as farms grow from a very small size and the cost curve becomes relatively flat over a wide range in size; that is, most of the economies are attained at relatively small sizes. Capturing the relatively small remaining economies involves much further growth beyond the size where most economies can be attained (13).

There may, however, be significant market economies in the purchase of inputs and sale of outputs that can be achieved by further growth of the firm. It could also be suggested that, historically, it has been more common that economies of size have resulted in “functions” or “operations” breaking away from farming (such as marketing and processing of products), thereby resulting in technical size economies in these input supply and marketing functions rather than in the production of products. To the extent that these market economies result from real savings in the cost of providing such farm services, these market economies contribute to lower food costs for consumers. (Studies are underway to identify and evaluate these market economies.)

¹³ New technology will obviously keep changing the cost curves. One issue may be whether a new technology (such as a larger tractor) actually lowers costs of a large size farm or simply raises costs for smaller farms. Such a technology would provide incentive for growth but would not lower food costs.

¹⁴ Technical economies of size refer to those savings or efficiencies gained by utilizing resources more efficiently within the firm. They contrast with market economies resulting from large farms being able to negotiate higher prices for products sold and lower prices for inputs purchased.

Table 22—Least-cost farm sizes for various farming situations, 1979

Region/farm type	Size at which 90 per- cent of economies are attained		Size at which 100 per- cent of economies are attained	
	Sales	Area	Sales	Area
	<i>Dollars</i>	<i>Acres</i>	<i>Dollars</i>	<i>Acres</i>
Northern Plains/wheat-barley farm	13,000	177	105,000	1,475
Pacific Northwest/wheat-barley farm	54,000	449	156,000	1,887
Corn Belt/corn-soybean farm	60,000	299	145,000	639
Southern Plains/wheat-sorghum farm	28,000	399	100,000	1,488
Delta/cotton-soybean farm	47,000	335	122,000	1,237
Southern High Plains/cotton-sorghum farm	58,000	395	175,000	974
Southeast/peanut-soybean-corn farm	55,000	143	130,000	399
Average (arithmetic) of seven farms	45,000	314	133,000	1,157

Source: Unpublished studies, U.S. Dept. Agr., Econ. and Stat. Serv.

How do the major commodity farms in the principal producing States compare on average with the least-cost sizes noted above? Again, the comparison is limited: the Census data are for 1974 while the seven farming situations are for 1979. But by adjusting the 1974 situations to 1979 dollars, we can gain some notion of the relative magnitudes. The comparisons in table 23 suggest that most primary farms are of a size where most of the technical economies can be attained.

Only four types of primary farms appear to have attained an average size exceeding the point where 100 percent of the technical economies can be attained: the Texas cotton farm (measured by acreage), the Arkansas and Mississippi cotton farms (measured by gross sales), and the Kansas wheat farm (measured by gross sales). Note, however, that averaging implies that many farms included in these averages exceed the size at which all technical economies can be attained.

Farm size-cost relationships become important when treating the unit cost of production of individual commodities, the basis for determining benefits for many of the present farm programs. The general relationship is that production cost per unit (bushel, bale, or hundredweight) declines as farm size increases, up to some point. It has also been suggested that farms specializing in production of a commodity in an adapted production region, and of the size noted above, would likely have unit costs well below the average costs of all farmers producing the commodity. That is, farms in the Wheat Belt specializing in wheat would likely have costs of producing a bushel of wheat well below those of producing a bushel of wheat on a corn farm in the Corn Belt; likewise, Corn Belt farms can produce a bushel of corn much more cheaply than can farms in the Southeast.

The unit cost is linked to the current farm programs through the target prices. These prices were initially established (and

are adjusted annually) in relation to national average cost of production of essentially all the acreage of the crops grown. Thus, high-cost producers and high-cost regions are factored into the average along with low-cost producers and low-cost production regions. To whatever extent the average cost and the resulting target price exceed the cost of the low-cost producers in the major producing areas, the target prices provide those producers with what is usually referred to as a windfall gain. Likewise, to the extent the high-cost producers and areas have costs that exceed the average and the resulting target prices, they will receive insufficient program benefits. The implications of this have been discussed elsewhere (15); the major impacts are the capitalization of the windfall benefits into capital assets, principally land. The rising land prices and farm consolidation have been two rather apparent manifestations. Less apparent is that, from society's point of view, such programs foster inefficient resource use, lower production, and higher costs by subsidizing inefficient producers and producing regions and by retarding reallocation of resources on a national basis.

The implications for policy arise from the use of national averages (whether cost of production, target prices, loan rates, or other measures) as income, price, or cost standards. The diversity of today's farms means that single values for use across the entire farm sector should be seriously questioned. Use of such values may impede the programs' efficiency and cause the distribution of benefits to become even more skewed.

Implications for Future Public Policy

This article began with a review of the longstanding farm problem and the policies that were used over the years to address it. That problem was seen to be an excess of resources devoted to food production—a stream of technologi-

Table 23—Comparison of average farms from census data with efficient sizes from studies of typical farms

Type of primary farm	Average cropland 1974 census acres	Acreage to attain percent of economies—		
		100%	95%	
Acres				
Wheat farms:				
Kansas	1,003	1,840	515	
North Dakota	1,214	1,600	650	
Washington	1,470	1,850	630	
Montana	1,853	1,600	650	
Oklahoma	868	1,840	515	
Corn/soybean farms:				
Illinois	472	640	370	
Iowa	401	640	370	
Nebraska	638	—	—	
Indiana	478	640	370	
Ohio	464	640	370	
Cotton farms:				
Texas	1,019	970	780	
California	925	—	—	
Arizona	890	—	—	
Arkansas	823	1,180	1,020	
Mississippi	1,078	1,180	1,020	
	Average gross sales 1974	1974 gross sales in 1979 dollars ¹	Gross sales to attain percent of economies—	
			100%	95%
Dollars				
Wheat farms:				
Kansas	93,432	137,649	88,000	35,000
North Dakota	82,292	121,237	110,000	30,000
Washington	131,930	194,367	155,000	70,000
Montana	88,248	130,012	110,000	30,000
Oklahoma	80,945	119,253	88,000	35,000
Corn/soybean farms:				
Illinois	90,904	133,925	145,000	80,000
Iowa	83,349	122,794	145,000	80,000
Nebraska	90,229	132,930	—	—
Indiana	91,796	135,239	145,000	80,000
Ohio	84,162	123,992	145,000	80,000
Cotton farms:				
Texas	93,510	137,764	175,000	125,000
California	360,065	530,468	—	—
Arizona	306,015	450,839	—	—
Arkansas	124,310	183,141	115,000	115,000
Mississippi	172,771	254,536	115,000	115,000

— = Data not available for these States.

¹ The 1974 dollar sales estimates were inflated to 1979 dollars by the Consumer Price Index.

cal advances kept production capacity growing faster than the requirements of the domestic and foreign markets. The result was low commodity prices and farm incomes low in relation to incomes of the nonfarm population. Public programs to aid farm families were then instituted. The problem proved to be chronic as resources were slow to leave agriculture and the technological advancements permitted continued growth in production, even with fewer and fewer farmers. But since society benefited from the technological advancements, it supported continuing public expenditures for farm programs.

Over the years, labor resources migrated from agriculture at a varying pace and, at the same time, the domestic and foreign markets grew, gradually bringing the production potential and market requirements into closer accord. Sometime in the early seventies, most of the excess capacity was absorbed and a much more evenly balanced supply and demand situation was finally reached for the first time in over 50 years.

As we enter the eighties, the long period of adjustment to excess capacity and disequilibrium in U.S. agriculture appears to be finally behind us. The implications of that alone are significant enough to merit a major review of the policies, programs, and institutions that attended that period. But the factor that is in large part responsible for bringing the disequilibrium to an end—the growth in global demand for U.S. agricultural products—promises to continue with significant impacts on the market environment in the decade ahead.

The Prospective Agricultural Economy

The economic environment for domestic agriculture will probably be largely determined in the years ahead by global production and consumption developments, even more so than in the past few years. Increases in global food production in the eighties may come more slowly than in the past. Yet, global food demand seems likely to exhibit continued strong growth. A more complete use of the world's more productive and relatively accessible land will be required. World agricultural trade will continue to grow in importance, with continued growth in the demand for U.S. products as the rest of the world becomes increasingly dependent on the United States for food supplies. This could suggest a sharp contrast with the past; instead of real declines in commodity prices as in most of the postwar period, real commodity prices over most of the eighties may rise.

This relatively favorable outlook for domestic agriculture does not come without concerns. Fluctuations in production and consumption virtually anywhere in the world will be amplified in the demand for U.S. products, as the United States assumes an increasingly dominant role of world food supplier. Demand fluctuations for U.S. products tripled in the seventies; this variability could again double in the eighties.

Such potential instability in agricultural commodity markets promises to be a major concern.

As domestic agriculture becomes much more interdependent with the rest of the world, the characteristics of the farm sector are even more important in policy deliberations. Some of those characteristics, whose implications will form the focus of the farm bill debates are summarized below:

- The farms that comprise the sector today have widely diverse characteristics, especially size. Three rather distinct groups appear to have evolved: "rural farm residences," the very small places with sales of less than \$5,000 and constituting 44 percent of all farms; "small farms," with sales of \$5,000 to \$40,000 and constituting about 34 percent of all farms; and "primary farms," with at least \$40,000 in sales and constituting 22 percent of all farms. The contributions of these groups to total outputs is inverse to their proportions of total numbers, reflecting the large concentration of production today.
- The economic well-being of these groups, especially of the smaller two, has in recent years become more closely tied to the nonfarm economy than to the farm economy. Income from nonfarm sources surpasses by several times the income from farming for the two smaller sized groups. This advent of significant nonfarm earnings has markedly reduced the disparity of incomes among farm people and reduced the disparity in incomes between the farm and nonfarm sectors. The incomes of the small farm group, however, are a little less than the national median.
- The rates of return to investments in the farm sector have increased significantly over the past decade, both from current income and from capital gains but more rapidly for capital gains. Farm investment returns now appear to compare favorably with earnings on investments in the nonfarm economy.
- The inherent instability in agriculture was significantly increased in the seventies with the advent of rapid growth in export markets. This instability, ultimately reflected in farm earnings, most severely affects those farms most reliant on farm income—the primary and, to a lesser extent, the small farms; least affected are the residence farms.
- Subdividing the primary farms by type of principal commodity produced reveals that a surprisingly small number of farms accounts for the large proportion of production of each commodity.
- The financial structure of farms has changed radically from the fifties owing to the greater use of purchased production inputs and the growing use of debt capital. As a result, the annual cash requirements of most farms have greatly increased to the point where most farmers now

have large annual fixed financial obligations. The extent of their cash needs varies among farm sizes, being greater for farms of larger sizes, and most pronounced for the primary farms, whose debt-to-asset ratio and cash expense-to-production receipts ratio are much larger than for the smaller farms.

- The longrun average cost curve for farms declines rapidly as farm size increases, up to a point, and then becomes relatively flat over a wide range in size. Most of the primary farms have reached, or are significantly larger than, the size needed to attain most cost economies. The major portion of food and fiber is thus produced by firms that have achieved most technical efficiencies.

U.S. agriculture enters the eighties in a much different position than it was even a decade ago. Millions of modest-sized family farms, the initial object of farm assistance programs, are no longer there. The problems confronting the remaining farms are of a much changed nature from those that so long prevailed. Moreover, the future economic climate for agriculture may be far different from that to which we have grown accustomed. In combination, these two conditions suggest that old policy prescriptions are unlikely to be effective in the eighties. We will more likely be confronting problems with which we have little familiarity. It thus seems prudent that we now begin to draw up and assess more fully the implications of the likely new era. With 1981 being another major legislative year for food and agriculture, it is especially timely to explore their meaning for the development of future public policies.

Implications

Some of the implications of the foregoing material with relevance to upcoming legislative deliberations are suggested below.

- Smaller farms earn little income from farming. Thus, we cannot solve the poverty or low-income problem of smaller farms with commodity price policy or farm policies. The larger (primary) farms as a group appear to have competitive levels of income and returns.
- Yet, their competitive incomes and rates of return do not mean that the primary farm group has no problems. The changed financial structure of these farms implies that they are much more vulnerable to variability of incomes and returns. This is especially true for the most financially leveraged farmers, those with little equity who have gone into debt to acquire assets: generally the new

farmers. Such farmers would probably benefit from price stabilizing programs; and those programs would benefit not only the most heavily leveraged farms, but also the overall system by protecting the nonfarm economy from disruptive impacts. Also, we need to look into the possible structural impacts of instability and the resiliency of the food system to shocks.

- Failing to recognize the fundamental changes in agriculture will obscure identification of the real problems that now exist and thus impede the development of more appropriate new policy and program approaches. Most of the basic program instruments (or mechanisms) that are in use were developed specifically for treatment of the income problem. These mechanisms (price support loans, direct purchases, production controls, marketing quotas) are largely oriented to enhance commodity prices. They provide benefits based on the volume of production, implicitly skewing the distribution of benefits to the larger volume producers, much fewer in number than the smaller volume producers. And, they implicitly treat the farm sector as a homogeneous monolith through use of national averages for setting program parameters (loan rates, target prices, costs of production), implicitly favoring groups with costs of production below the national average. It is highly unlikely that future use of these instruments, without substantial modification, would prove effective (or cost efficient) in treating current and emerging problems.
- The success of the farm sector in providing food at an ever declining proportion of consumers' disposable income was largely possible through greater efficiency achieved in the main by farm consolidation, the growth in size to capture the existing technical economies. Results from recent studies indicate that the primary farms, as a group, have achieved or are beyond the size of least-cost operations. That is, the technical economies (and, one could conjecture, the market economies as well) have largely been realized with existing technology and price relationships. Thus, while individual farmers could increase their incomes, there would appear to be no major gains to be had by consumers from further consolidation and size growth within this group of farms.
- Evidence also suggests that public policies (tax, commodity, credit) interact to encourage growth in farm size. An issue is whether it is appropriate to have benefits skewed to large farms or whether public policies should be "neutralized" in terms of distribution of benefits by size.
- The rise in tenancy—separation of landownership from operation, owing largely to high land prices, which serve as a barrier to entry—also affects the distribution of pro-

gram benefits. It is widely agreed that most of past program benefits have largely been capitalized into the value of land to the benefit of landowners. If continued, such programs would prove to be of little benefit to the increasing number of farmers who rent most of the land they operate. Continuing increases in land prices can also be expected to attract nonfarm investors as competitors with farmers for available land.

- Further, to the extent that the intended benefits of farm programs get capitalized into asset values, the intended distribution of benefits is perhaps subverted. Therefore, preventing benefits from being capitalized into land and other asset values may be an increasingly important aspect of future policy development.
- Another emerging consideration is that we guard against resource use policy that encourages exploitation of land and water in the short run to the detriment of long-term productive capacity or environmental quality. The "equilibrium perspective" and prospects for increased demand in the eighties increase the urgency of this need. The interaction between commodity and conservation programs needs more attention, along with other conservation incentives, as a way of internalizing the private cost of using resources that otherwise are or would become costs borne by society at large.
- If real commodity prices do rise, they will provide incentives for greater production. Cropping will move onto more fragile lands and land already in crop production will be used more intensively (more fertilizers, pesticides). This could result in greater environmental degradation and the loss of future productive capacity. The intensity of these concerns will depend heavily on the factors which will affect pressure on the land base. The important point here is that these possible impacts be recognized.
- The vintage rationale for farm policy, the justifications often given for regulation of the industry and expenditure of tax dollars, is no longer strictly valid. But, this is not to say there is no longer any rationale or justification for public programs for agriculture. Rather, the rationale and justification for programs to treat the current major problem (stability) are quite different from those invoked for the traditional low-income problem. In fact, the rationale and justification are now perhaps even stronger and more broadly based.

Public policies for agriculture have usually followed rather than preceded events and changing economic circumstances.

This was perhaps not so critical when the course of events was on a trend path. Available evidence suggests that economic conditions may be diverging from the trend. If true, it would seem more important than ever that future policy anticipate economic conditions.

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Global Prospects

Changes in the Farm Sector

Inflation

Inflation and Agriculture

Lyle Schertz and David H. Harrington*

Persistent high rates of inflation, beginning in the late sixties, have become one of the most pervasive, but least understood forces affecting the U.S. economy. A consideration of inflation, and its impact on agriculture and the general economy, is important to any realistic perspective on the setting for food and agriculture in the eighties for several reasons. Inflation raises prices for farm inputs as well as for farm products, resulting in uncertain effects on current net income of farmers; but it greatly raises the value of farm assets. Perhaps most important, the pressure of persistent high rates of inflation changes the economic behavior of farmers and other citizens. They try to benefit from inflation or at least keep up with it. These changes in economic behavior ultimately change the consequences of public policies and programs designed to assist groups or to control inflation in the economy.

Many food and agriculture policy issues have their roots in inflation. Inflation drives up production costs, triggering pressures for higher commodity price supports; it changes the effects of special tax rules for farming, stimulating changes in ways that farms are organized in order to take advantage of those tax rules; it leads to excessive demands for credit as farmers try to acquire more assets in order to get capital gains from increased land prices; it widens the wealth and income gaps between those who own land and those who do not; it leads to increased concentration of farmland ownership by strengthening the economic position of wealthier and higher income people who buy land; and it produces hidden conflicts within the farm sector and between farmers and nonfarmers because inflationary gains by some often depend on losses by others, whether or not the losses are readily apparent.

This article examines the effects of inflation on U.S. farming and some of the important relationships between inflation and public policies related to food and agriculture.

Relation of Inflation to Farming

Inflation has four primary impacts on U.S. farming.

- It increases nominal prices of farm products as well as the nominal prices of inputs, but its effects on net farm income adjusted for inflation (real net farm income) are uncertain.
- It stimulates purchases of capital inputs (machinery) and additional land by farmers with consequent effects on costs of production and pressures for higher commodity price supports.
- It increases the wealth of those who own the land.
- It strengthens the relative economic position of wealthier and higher income people in buying additional land.

Farm Product and Input Prices

Although inflation increases the nominal prices of both farm products and farm inputs, its effect on net farm income is not quite so clear. One study found that farmers are hurt more by inflation than they are helped (7).¹ In contrast, another study concluded that it is not clear that product prices "... habitually rise less fast or respond less quickly than input prices under inflation" (2). The latter conclusion is consistent with a recent USDA analysis based on quarterly data for 1960 through June 1978 (5).

Prices in our economy change for a variety of reasons, of which inflation is only one. Changes in the general price level (inflation) are due to a combination of the aggregate amount of goods and services available in society, the aggregate demands for these goods, the amount of money circulating in the economy, and practices that raise consumer prices to cover higher production costs. Thus, prices of individual farm products and inputs may rise faster or slower than the rate of inflation.

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¹ Italicized numbers in parentheses refer to items in the References section at the end of this article.

Purchase of Inputs

Inflation encourages farm operators to buy larger equipment and buildings sooner than they otherwise would. During inflationary times farmers (and nonfarmers) reason that since prices are likely to increase one can buy for the future at today's "bargain" prices and realize a speculative gain. This situation also encourages lenders to make credit available for equipment even if the capital goods will not be fully utilized immediately.

The effects of such actions are threefold. First, the demand for (hence, the prices of) capital goods such as tractors and equipment increases. Second, the investments add to the cost structure of U.S. farming in the short run and are reflected in lower profits by the industry. This effect is translated into pressure for higher price supports and other Government actions to increase farm receipts. Third, when farmers anticipate their future equipment requirements and, therefore, purchase equipment with capacity greater than necessary for land presently under their control, they then seek to purchase more land to fully utilize the capacity of their equipment. This contributes to the consolidation of farmland into larger operating units and bids up land prices.

Increases in Wealth

Several points are especially relevant to the relationship between inflation and the wealth of those who own farmland:

- Farm earnings increased rapidly in the early seventies and again in the late seventies.
- The value of farm assets increased much faster than the rate of inflation during the seventies.
- Higher expected farm earnings appear to be the major determinant of the increased value of farm assets. Thus, net returns to farming during inflationary times are composed of both current income and capital gains to land-owners.
- Returns to farming, from both current earnings and capital gains, have exceeded returns to common stock and thereby encouraged investment in farmland by established farmers and nonfarm investors alike.

Farmers have experienced a dramatic increase in wealth, whether measured in current or constant dollars (adjusted for changes in the general price level). In current dollars, farm physical assets (land and buildings, machinery, livestock, and crops stored on and off farms) more than tripled in value

during 1960-78 (fig. 1). The increase in constant 1978 dollars was also dramatic—65 percent.

In only 2 years did land price increases fail to equal the rate of inflation (fig. 2). Thus, the increase in farm-related wealth of farm asset holders surpassed the effects of inflation by a wide margin, and their real wealth increased substantially. Farm wealth as a proportion of total national wealth increased from 7.7 percent in 1970 to 8.7 percent in 1978 (3).

The increase in the value of farm assets reflects the increased earnings from farming and, more importantly, expected future increases in those earnings. Higher growth rates in current earnings lead to higher current prices of the assets (4). In addition, the longer run results of higher growth rates of current returns are to depress the ratio of current earnings to asset values and to increase the rates of capital gains. This relationship is especially important because low rates of current earnings are often cited to justify policies to increase farm income. Perhaps of even more significance is the fact that the same arithmetic of land pricing indicates that land prices could decline (resulting in capital losses to owners) even if farm earnings continued to increase but at a slower rate than in the past.

Figure 1

Farm physical assets, 1978 and current dollars

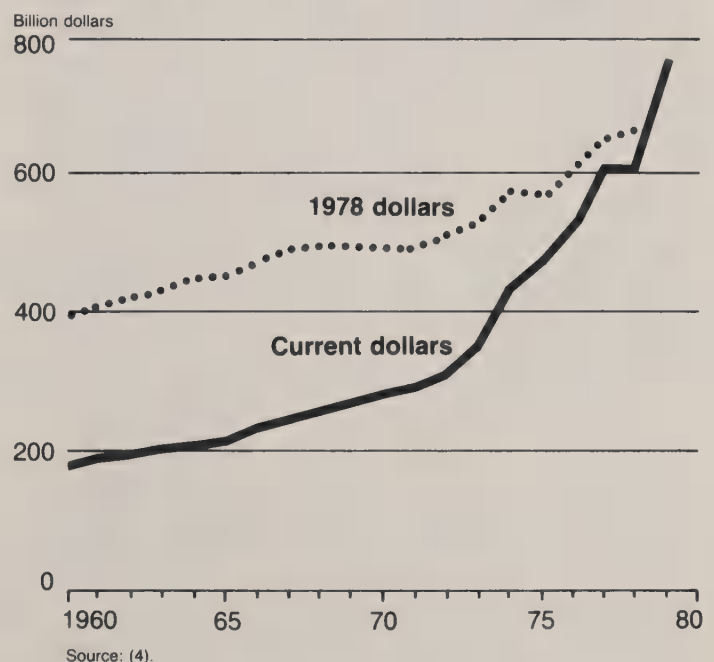
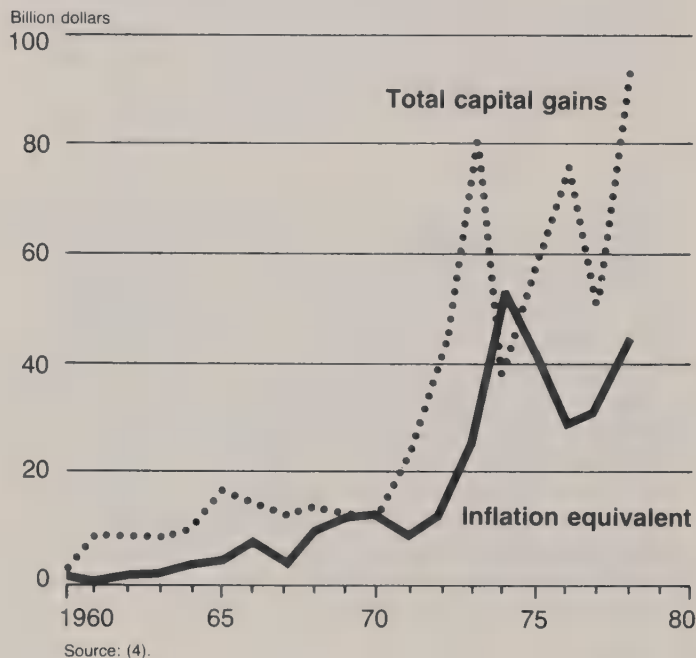


Figure 2

Capital gains of farm physical assets and inflation equivalent



Combined returns to investments in farming from changes in real earnings and inflation have increased over time, relative to returns to investments in common stock of U.S. industry (fig. 3). A comparison of averages of these returns in the sixties and the seventies illustrates the increased financial attractiveness of farming relative to owning common stock. For example, annual earnings from farming were greater than that of common stock but by only small amounts (table 1). The capital gain return from farming was one-third less than that from common stock in the sixties; but in the seventies, the capital gain return from farming was over 11 percent per year, while the capital gains on common stock was less than 1 percent per year (3).

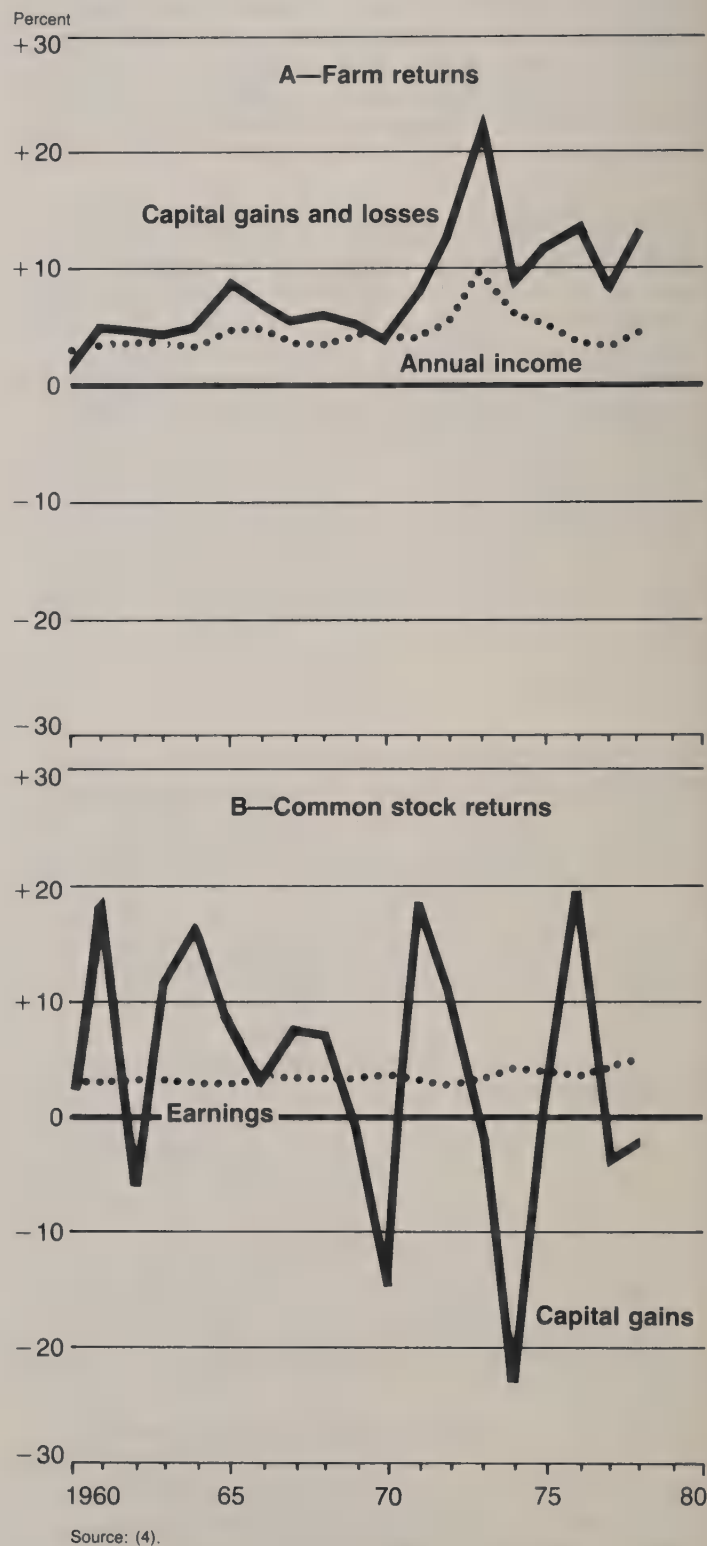
Table 1—Returns from farming and common stocks

Period	Farming		Common stocks	
	Annual earnings	Capital gains	Annual earnings	Capital gains
<i>Percent</i>				
1960-69 avg.	3.46	4.53	3.19	6.99
1970-78 avg.	4.69	11.59	3.92	.72

Source: (3).

Figure 3

Farm and common stock returns



Thus combined returns (current earnings plus capital gains) to farming have been much more favorable than those from common stock.

The Strengthened Economic Position of the Wealthy

Higher rates of inflation result in higher interest rates for borrowing money (fig. 4). In contrast, the current earnings from farmland were about 5 percent per year during the seventies. Thus, interest rates were higher than earnings in most years (5).

Interest rates affect prospective cash flows available to different bidders for farmland. High interest rates resulting from inflation strengthen the competitive position of the wealthy, both farm and nonfarm, in buying land. Potential purchasers of land can be divided into two groups: (1) those with income or monies in addition to the income from the land purchased, and (2) those without such income or monies. The first group can outbid the second for land when interest rates exceed the likely current earnings from land. In many cases, the first group includes landowners who have income from land that was inherited or purchased previously. The first group also includes those who have other income or assets that can be sold to generate money to service the debt on the farmland being purchased when cash flow is negative. Thus, people with sources of money other than the land

being purchased have a clear competitive edge over those without such sources. That edge is greatly strengthened by inflation. Individuals without other income sources would be unable to service a mortgage for a land purchase. Consequently, it is extremely difficult for new people to enter farming during inflationary periods unless they inherit wealth, have other income sources, or are subsidized by public policies.

The Stage is Set for Separation of Ownership and Use of Land

The high market value of even moderate-size farms make intergenerational transfer of resources to one child (when other children are living) extremely difficult. Because of this, traditional full owner-operator farms may become increasingly rare in the future. Farm families transferring assets from one generation to another often wish to include all their children as heirs, with descendants expected to receive equal parts of the inheritance. With increased land values relative to net farm income, the assets of even moderate-size farms cannot be consolidated easily into the hands of one or two children when other children are involved. The increasing inability of one heir to purchase the interests of the other heirs, and their natural inclinations not to give up their inheritance, seems likely to lead to multiple ownership of individual land parcels by the descendants of those who experienced the high capital gains of the seventies.

With the wider dispersal of landownership among many landowners and fewer farm operators, the traditional owner-operator farms may become less common. Already part-owner farms make up 27 percent of farm numbers and operate 53 percent of the farmland. Actually, the availability of rental land provides flexibility to beginning farmers and allows others to grow without incurring the large capital costs of ownership.

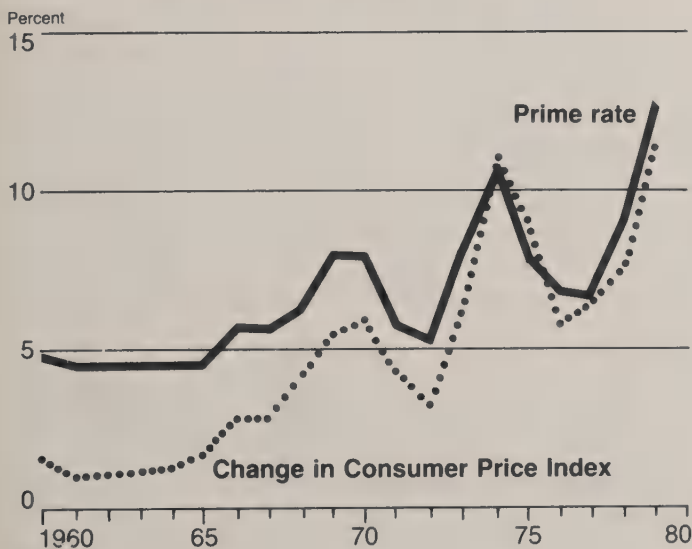
Effects of Inflation Are Reinforced by Other Policies

Many policies reinforce the effects of inflation in strengthening the competitive position of the wealthy in buying land and encouraging the separation of ownership and use of farmland. For example, the effects of credit programs and policies (such as stimulating the availability of credit for farmland purchases) are markedly different in periods of inflation vs. periods of stable prices. In inflationary times, people without other sources of money simply do not qualify for loans. In periods of stable prices, the same people are more likely to qualify because interest rates are more commensurate with current earnings from such investments and prices of land will not reflect expected increases of earnings associated with inflation.

The economic strength of the wealthy to acquire land and their aggressiveness in doing so are also reinforced by Govern-

Figure 4

Prime rate charged by banks¹ and change in Consumer Price Index²



¹Average effective rate.

²Percent, year to year, index of all items.

Source: *Economic Report of the President*, January 1980.

ment programs that increase farm prices and reduce production and price risks. These programs make such people more confident about their economic future and their ability to repay debt. It enhances their bankers' confidence as well, because the chances of these people going bankrupt are lessened by the public's assumption of risk. Thus, those who are inclined to be aggressive are encouraged to be more aggressive.

Tax rules also reinforce the effect of inflation in strengthening the competitive position of the wealthy. For example, some people who combine income from nonfarm activities with income from farming activities can deliberately generate a loss (calculated on the basis of tax rules) in farming, by using interest payments, depreciation, and development costs as deductions from current income while increasing the ownership and value of physical assets. Later, the physical assets can be sold and the profits taxed as capital gains (only 40 percent of capital gains is considered in calculating income taxes). The effects of the process described are to convert current income into capital gains, thereby reducing taxes, or to shift current income into estate accumulation, thereby postponing any taxation of the income.

This concept of tax shelters is commonly held to apply to individuals "outside of" farming. However, it is important to recognize that the same tax provisions are used regularly by farmers to lower their taxable income. For example, a lawyer may utilize a farm operation to generate \$50,000 of accounting losses to place against his \$75,000 income from practicing law, or a farmer may utilize a similar set of farm resources to generate \$50,000 of accounting losses to place against \$75,000 of income from other farm operations (6). Should the two situations be viewed differently?

In summary, the trend toward increasing farm size and investment in farms by people who are already wealthy or have related income sources, is encouraged by inflation and reinforced by public policies on credit availability, commodity price supports, and income tax rules.

Inflation and Public Policies for Agriculture

Inflation increases the conflict among policy goals. Instituting a policy to aid in solving one problem frequently makes several others worse.

The effects of inflation on agriculture can also be viewed as three core effects of inflation on farming, which induce three peripheral effects as farmers and others react to inflation. These core and peripheral effects are extremely important when considering the impact of public policies on agricultural incomes, prices, credit access, and production.

The core effects of inflation on farming include:

- Inflation raises the prices for farm products as well as purchased inputs: machinery, fuels and energy, fertilizers, etc. Manufacturers and dealers pass their cost increases on to farmers.
- Inflation raises interest rates as savers and lenders seek to earn rates of return above the expected inflation rates. If savers require a 3-percent real return after inflation and expect a 10-percent inflation rate, they will not lend funds at less than 13-percent interest.
- Persistent inflation results in a correspondingly persistent split in returns to farming between current net income and asset appreciation (capital gains). Rates of inflation experienced since the midsixties caused returns to farming to be split so that less than half of the returns were received as current income and more than half were received as deferred income—capital gains.

Those core effects of inflation on farming alter the way that farmers, suppliers, and lenders pursue their economic objectives; their reactions induce three peripheral effects of inflation:

- The low current income from farming motivates farmers and farm organizations to seek increased farm product support prices and to extend price support policies to more commodities. Response to this pressure can result in higher prices for consumers and in higher rates of inflation in the general economy.
- The persistent split in returns from farming between current income and asset value appreciation leads farmers to expand their operations more aggressively for several reasons: they want to improve their wealth or benefit from inflation; they may value creating a larger farm or a larger estate as much as they value a higher current income; and they observe that they can minimize their income tax liability by continuously and aggressively expanding their farms. Thus, asset appreciation results in strong pressure by some farmers to grow and consolidate their farms—causing rapid increases in farm size and declines in farm numbers.
- The attractiveness of buying assets with borrowed money and policies related to credit, price supports, and taxes lead to very heavy reliance on credit both for farm expansion and farm operation. The results have been high credit demands by established farmers, and almost insurmountable barriers to entry for new farmers without other sources of money.

Policies toward agriculture in an inflationary setting must come to grips with tradeoffs intensified by inflation. Policies

that may have beneficial effects in periods of stable prices quite frequently have overwhelming side effects during inflation—effects that may impede achieving the original goals of the policy. For example, providing subsidized credit to farmers during periods of stable prices could reduce production costs for farm products if the credit led to net new investment, and if commodity programs permitted the resulting production increases to be reflected in lower product prices. During inflationary times, credit to agriculture facilitates aggressive bidding by the wealthy to obtain more farmland while others cannot qualify for loans; thus it speeds up the rate of increase of land prices, setting the stage for increases in costs of production. Some other examples: providing tax breaks to agriculture may worsen the net income position of current farmers by attracting nonagricultural capital into farm production, thereby increasing supplies of farm products and reducing farm prices; or, increasing the levels of support for farm product prices in an attempt to increase the rate of return from farming may cause more rapid increases in land values and credit usage, resulting in poorer rates of return in farming.

In order to frame realistic policies for agriculture in the eighties, many such tradeoffs of values must be addressed.

Income Policies

Are incomes in agriculture inadequate, and by what standards? Income comparisons between the farm and nonfarm sectors have most frequently considered only current net income and compared only the average incomes of both populations.

In inflationary times, the wealth positions and wealth accumulation potentials of farmers with significant landholdings greatly exceed that of the general population and other farmers. Furthermore, average net income in agriculture reflects the existence of overwhelming numbers of small farms, a large proportion of which have nonfarm incomes. Do the current policies accurately reflect the differences in economic well-being between each of these groups?

Price and Risk Policies

In periods of unstable prices, do farmers or consumers or both require protection from adverse prices? Considerations here involve the levels of price protection afforded each group by the “price corridor” within which the market operates. In current price policies, these limits are influenced by the loan rates for commodities and the release and call prices for commodities in the farmer-owned reserve. In the eighties, projected continuing inflation sharpens the conflict between the interests of farmers for higher prices, the interests of consumers for stable and lower prices, and the interests of the public to control the rate of inflation.

Further, as pointed out above, policies that shift price and production risks from the producers to the public reinforce the competitive position of the wealthy in accumulating more farmland which leads to fewer and larger farms.

Farm Finance and Transfer Policies

Farm finance and transfer questions include: Should credit be more or less abundant for agriculture? Should entering farmers be encouraged or assisted to overcome the financial barriers to entering farming? Should farms, large or small, be allowed to be transferred intact from one generation to another? Preserving our present farm system with a relatively high proportion of moderate-sized owner-operator farms who may rent additional acreage crucially depends on maintaining the proper balance between farm assets available for purchase, farm operators (new or established) wanting to purchase those assets, and access to credit with which to purchase them. Too much or too little of any of these factors, whether due to imbalances of earnings and assets values, expected inflation rates, high interest rates, or concentration of wealth, endangers the continuation of the present farming system.

The earlier discussion that policies have different effects during inflationary conditions than during stable conditions is especially applicable to credit. As with policies that shift price and production risks from the producer to the public, policies to increase credit availabilities in inflationary times also reinforce the economic advantage of the wealthy in accumulating more farmland and lead to fewer and larger farms.

Production and Technology Policies

Improved productivity of resources is being seen more and more as part of the solution to inflation (supply-side economics). Two sets of issues are especially important for agricultural policy:

- What is the effectiveness of our research institutions in developing new techniques that will lead to increased production, and how much public money should be allocated to this task?
- What policies stifle production, withhold resources from production, and limit supplies available in U.S. markets?

The questions that agricultural policy must address include: the role of agricultural science policies, beneficial adjustments in the technology and organization of agriculture, and the international competitiveness of U.S. agriculture.

Two Themes in Conflict

Two major objectives of legislators have opposing implications for legislation related to special clientele groups such as established farm owner-operators or food stamp recipients. The two objectives are:

- To enhance the economic position of particular clientele groups.
- To stop inflation.

The first objective leads to advocacy of higher commodity price supports and more liberal food stamp benefits. The second encourages actions that freeze, reduce, or perhaps eliminate commodity price supports and food stamp benefits.

People naturally try to gain protection, often through legislation, from the adverse effects of inflation while trying to reap any benefits. The ideal situation for any group would be:

- To arrange protection from increases in the general price level and the specific price increases associated with it.
- To be in a position to take advantage of such increases if they should occur.
- To avoid any burdens associated with steps taken to arrest inflation.

The worst situation for anyone, of course, is to have no protection against the adverse effects of inflation, to be forced to shoulder a disproportionate share of adjustments aimed at arresting inflation, and for the inflation to continue unabated.

If major groups are able to protect their positions and avoid adjustment burdens, the forces of inflation are not likely to be arrested; inflation will continue and society in general will lose. Thus, the challenge for legislators becomes even more complex. For clientele groups to be protected, legislation or institutional arrangements are required to protect selected clientele groups while exposing other groups to both the adverse effects of inflation as well as the efforts designed to stop inflation.

Evaluating the tradeoffs between assisting special groups and stopping inflation is complex. Whether a particular food, agriculture, or rural development program is inflationary or not relates particularly to:

- The implications of the program for the amount of money in the economy.²
- The effect of the program on supplies of goods and services in U.S. markets.

In general, programs that lead to creating more money to finance Government expenditures are inflationary unless currently unemployed resources can be employed without increasing per-unit costs of production. Programs that limit supplies in U.S. markets are inflationary, even if the budget is balanced. Finally, programs that increase supplies of goods and services in U.S. markets are deflationary under a balanced budget.

The winner-loser phenomenon associated with inflation reinforces the conflict of the two major objectives identified earlier. There are strong incentives for clientele groups to advocate legislation and conditions that protect them from inflation. This approach may involve both advocating legislation that indexes administered prices and fostering monetary conditions to accommodate such price increases indirectly. If this "indirect" approach is followed, other prices are not forced lower but inflation continues and losses are experienced by those whose wages and product prices do not increase as fast as the inflation rate. The alternative, to index wages and prices for some groups but restrain monetary conditions in order to maintain stability of the general price level, would lead to declines of those prices not indexed. Thus, the adverse effects of the indexed prices on others in the economy would be more direct and more obvious.

The resolution of these food and agriculture policy questions in the light of strong inflationary pressures is a formidable task. If these issues are not addressed or improper policies are instituted, the results will be greater conflict among farmers and between farmers and consumers of farm products, continued or increased inflation in the general economy, and increasingly limited economic opportunity for everyone participating in the growth of our economy.

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Global Prospects

Changes in the Farm Sector

Inflation

Capacity for Greater Production

Agriculture's Production Potential

Austin S. Fox and Kenneth C. Clayton*

By the close of the seventies, it was apparent that the demand for agricultural products had increased in a fundamental way. The new demand related chiefly to mounting international efforts to upgrade diets and to meet the food requirements of larger populations throughout the world. Greater domestic needs for food, fiber, and fuel production were also important.

Our concern here is with the ability of the agricultural sector—its productive capacity—to meet the global and domestic needs for food, fiber, and fuel in the eighties. Clearly, if anticipated increases in demand are to be met, resources must be available at a cost that will encourage their use. That is to say, the prices of agricultural commodities will have to be sufficient to attract the necessary additional resources into agricultural production.

In this paper, we first examine current production and resource use; then, resource availability to meet projected needs, both for domestic and global food needs and for increased production of grain-based alcohol fuels. Information on resource availability is evaluated in terms of anticipated economic conditions and changes in prices, costs, and incomes that will have to be forthcoming if future needs are to be met.

Some highlights from our review:

- Additional cropland totaling as much as 33 million to 41 million acres will have to be developed to meet anticipated demand by 1990 if projected global and domestic demand materializes. An expansion of that magnitude seems to be physically possible, provided that farmers have sufficient profit incentive.
- The expansion in cropland could be about evenly divided between that used for exports and that used to produce ethanol if the grain-based fuel production targets of the 1980 Energy Security Act are met. No significant in-

crease in cropland is projected to be needed for domestic use, although urban uses can be expected to absorb additional farm acres over the next decade.

- Prices received by farmers would have to increase substantially over the decade to induce the necessary cropland expansion.
- Other inputs (water, fertilizer, and pesticides) are projected to be in good supply to accommodate an expansion of production; and despite the likelihood that the prices paid for those inputs will probably rise over the decade, it will be to the farmer's economic advantage to increase their usage.

Our Productive Capacity

This evaluation of American agriculture's ability to meet projected needs focuses on resource use and availability for those inputs most likely to limit future increases in agricultural production: land, water, fertilizer, and pesticides. Adding to the complexity of determining productive capacity are concerns over soil erosion, water pollution, and general environmental pollution from increased use of fertilizers and pesticides.

Land Use and Availability

Crops were produced on about 377 million acres in the United States in 1977 (table 1). That is a little over a third of the land area in farms and ranches, and about a sixth of the land area in the United States. Cropland use grew to an estimated 389 million acres in 1980.

Traditionally, most acreage harvested has been used to produce crops for domestic consumption. From the thirties to the middle fifties, about 90 percent of the crops harvested were for domestic use and only about 10 percent were for export. Since the middle fifties, however, the acreage harvested for export has increased steadily. In 1978, about a third of all acreage harvested was for crops destined for foreign markets.

The acreage used to produce crops and livestock for domestic use has remained fairly constant since the early sixties. In

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1961, 235 million of the 302 million acres of crops harvested in that year were for domestic use; in 1977, about 233 million of the 344 million acres of crops harvested were consumed domestically. During this period, the acreage harvested for domestic use varied between 221 million and 246 million acres. Increased use of fertilizer, pesticides, irrigation, and new crop varieties helped to increase crop production per acre enough to meet increased domestic needs without using additional cropland.

Cropland Base

The total cropland base of 413 million acres in 1977 included cropland used for crops, idle cropland, soil-conserving crops, and short-term rotation pasture (table 1). Our interest here is primarily with the 377 million acres of cropland that were used for crops and the availability of other cropland and noncropland that could be converted to cropland and used for crops.

About 48 percent of the cropland used for crops in 1977 was in the Corn Belt and the Northern Plains (table 2). Another 30 percent of the cropland used for crops was distributed about equally among the Lake States, Southern Plains, and the Mountain regions. The remainder was dispersed throughout the Northeast, Delta, Southeast, Appalachian, and Pacific regions.

Table 1—Land use, United States, 1977¹

Land use	Acreage
	<i>Million acres</i>
Cropland used for crops	² 377
Idle cropland and soil-conserving crops	20
Short-term rotation pasture	16
Total cropland	413
Pasture	³ 132
Range	408
Forest	368
Other rural	80
Total non-Federal rural land	1,401

¹ Contiguous 48 States exclusive of Federal land and land in urban and other built-up uses.

² Includes cropland harvested, crop failure, and summer fallow.

³ Includes approximately 50 million acres classified as cropland used only for pasture in ESS statistics.

Source: Estimates of cropland used for crops, in soil conserving uses, and idle cropland based on ESS data. Estimates of short-term rotation pasture, other pasture, range, forest, and other rural uses, based on 1977 National Resource Inventory, Econ. and Stat. Serv. and Soil Cons. Serv., U.S. Dept. Agr.

Cropland used in the production of crops includes cropland harvested, crop failure, and summer fallow. Clearly, not all cropland used for crops is harvested and some acreage is double-cropped. In 1977, only 338 million of the 377 million acres of total cropland used for crops were harvested; but because 6 million acres were double-cropped, total harvested area of principal crops amounted to 344 million acres.

The 39 million acres of cropland that were not harvested (377 million acres less the 338 million acres harvested) included 9 million acres where crops failed and 30 million acres of cultivated summer fallow. Crop failure occurs in all regions but, over time, the largest acreages that fail are generally in the Southern Plains and Northern Plains, with a smaller amount in the Mountain region. Most of the summer fallow—nearly 16 million acres—is in the Northern Plains region. The Mountain region has about 10 million acres and the Pacific region about 4 million acres of fallow.

Table 2—Cropland and potential cropland, by region, 1977

Region ¹	Cropland used for crops		Potential cropland ²	
	<i>Million acres</i>	<i>Percent</i>	<i>Million acres</i>	<i>Percent</i>
Northeast	13.2	3.5	1.3	3.2
Lake States	38.9	10.3	2.6	6.4
Corn Belt	85.7	22.8	5.4	13.2
Northern Plains	94.1	25.0	5.6	13.7
Appalachian	18.5	5.9	5.4	13.3
Southeast	14.7	3.9	5.6	13.7
Delta	19.1	5.1	3.6	8.8
Southern Plains	35.4	9.4	5.7	14.0
Mountain	36.0	9.6	3.8	9.3
Pacific	20.9	5.5	1.8	4.4
Total	376.5	100.0	40.8	100.0

¹ States included in each of the regions are as follows:

Northeast—ME, NH, VT, MA, CT, RI, NY, NJ, PA, DE, and MD.

Appalachian—VA, WV, NC, KY, and TN.

Southeast—SC, GA, FL, and AL.

Delta—MS, AR, and LA.

Corn Belt—OH, IN, IL, IA, and MO.

Lake States—MI, WI, and MN.

Northern Plains—ND, SD, NE, and KS.

Southern Plains—OK and TX.

Mountain—MT, ID, WY, CO, NM, AZ, UT, and NV.

Pacific—WA, OR, and CA.

² Based on calculations assuming the ratio of prices received to prices paid is 100.

Source: Cropland used for crops from ESS data. Potential cropland based on supply schedule developed from SCS's 1975 Potential Cropland Survey and its 1977 National Resource Inventory Survey, Econ. and Stat. Serv. and Soil Cons. Serv., U.S. Dept. Agr.

In addition to the 377 million acres of cropland used for crops in 1977, another 20 million acres of cropland were in the idle cropland and soil-conserving crops not intended for harvest (table 1). There were also 16 million acres of rotation pasture used to grow crops on a periodic basis. The total of all these acreages adds up to the cropland base of 413 million acres as shown in the 1977 National Resource Inventory (Soil Conservation Service). All this land was readily available for crop production in 1977. In addition, another 45 million to 50 million acres of cropland were considered to be in permanent cropland pasture.

Some important regional shifts have occurred in cropland used for crops. In the last 30 years, the cropland base in the Corn Belt and Delta regions increased greatly, but those increases were largely offset by declines in the Northeast, Appalachian, Southeast, and Southern Plains regions. Cropland use in the Lake States, Northern Plains, Mountain, and Pacific regions have remained fairly constant over the past 30 years.

Increases in cropland use in the Delta region have come largely from extensive drainage and land clearing. In the Corn Belt, the increases in cropland have come from the conversion of pastures to cropland, and, to a lesser extent, through small-scale drainage.

Working against these increases in cropland has been a persistent withdrawal of land for urban uses—for roads, subdivisions, shopping centers, and the like. A recent study suggests an average loss of roughly 1 million acres per year, although other analysts suggest this loss may be higher or lower depending on definitions used.¹ Urbanization has contributed to cropland declines in most regions, although additions to the cropland base have more than offset losses in several of the regions.

Conversion Potential

In addition to the 413-million-acre cropland base, there is pasture, range, and forest land that could be converted to cropland given sufficient profit incentive. In 1977, such land was estimated by the Soil Conservation Service to amount to 36 million additional acres of high-potential cropland and 91 million additional acres of medium-potential cropland in the United States. Of the high-potential land, about two-thirds was evenly distributed among five of the farm production regions—Corn Belt, Northern Plains, Appalachian, Southeast, and Southern Plains.

The convertibility of noncropland depends in large measure on its present use. Much of the available pasture and range-land requires only plowing. Forested land, however, may re-

quire an investment of hundreds of dollars per acre to remove trees; and after that, roots and stumps may preclude some tillage operations for several years. The proportion of potential cropland now forested is particularly high in the Delta, Lake States, and coastal parts of the Appalachian and Southeast regions (table 3).

Much of the land that could be converted to cropland has limitations on its use and will require special management practices (table 4). For example, land with an erosion hazard may require terraces, stripcropping, or minimum tillage to prevent deterioration of the soil. Land with a drainage problem may require ditches or tiling to be cropped. Soil problems such as hardpan and rocks may require special

Table 3—Present use of high potential cropland

Region	Pasture-range	Forest	Other rural
<i>Percent</i>			
Northeast	50	21	29
Lake States	51	34	15
Corn Belt	83	12	5
Northern Plains	95	1	4
Appalachian	59	38	3
Southeast	59	39	2
Delta	53	43	4
Southern Plains	97	1	2
Mountain	98	1	1
Pacific	79	8	13
48 States	76	19	5

Source: 1977 National Resource Inventory, Soil Cons. Serv., U.S. Dept. Agr.

Table 4—High potential cropland: principal limitation on use

Region	None	Erosion	Drainage	Soil	Climate
<i>Percent</i>					
Northeast	5	46	35	14	0
Lake States	1	45	41	9	4
Corn Belt	9	57	31	3	0
Northern Plains	4	71	5	6	14
Appalachian	11	61	25	3	0
Southeast	5	47	29	19	0
Delta	3	29	67	1	0
Southern Plains	7	56	19	10	8
Mountain	0	63	3	15	19
Pacific	5	34	16	25	20
48 States	6	54	25	9	6

Source: 1977 National Resource Inventory, Soil Cons. Serv., U.S. Dept. Agr.

¹ *National Agricultural Lands Study, Final Report.* U.S. Dept. Agr. and Council on Environmental Quality, 1981.

preparation before tilling. Alkalinity may have to be contended with in certain semiarid areas where submarginal water supplies can be overcome only by supplemental irrigation.

Drainage problems predominate in the Delta, Lake States, Northeast, and coastal portion of the Southeast and Appalachian regions. Almost 30 percent of the Corn Belt's potential cropland will require drainage. Erosion constitutes the main problem for potential cropland in the Mountain, Plains, Corn Belt, and upland parts of the Southeast and Appalachian regions.

The Corn Belt and Delta regions have increased their acreages of cropland the most in recent years but still have significant acreages of potential cropland remaining, largely corn and soybean land. The Northern Plains, which has remained relatively constant in cropland acreage, has the second largest reserve of potential cropland, most of which would be wheat land and produce less food and feedstuffs per acre. The Southern Plains (Texas and Oklahoma) has the largest reserve of potential cropland of all the farm production regions. However, its post-World War II trend in cropland acreage has been steadily downward, due chiefly to reductions in cotton acreage. Also, expansion of irrigation has been partly offset by acreage abandonment as groundwater tables have been drawn down to the point where continued pumping is no longer economical. High-potential land in the Southern Plains is now mostly categorized as rangeland so that relatively low-yielding wheat and sorghum would likely be grown on any newly developed cropland.

The Northeast has had both a historic decline in cropland used and has relatively little potential cropland. The Appalachian and Southeast regions have experienced reduced cropland use but do have substantial acreages of potential cropland. Nearly 40 percent of the higher potential land in the Southeast and Appalachian regions is currently forested, and would require substantial investments for clearing.

The Mountain and Pacific regions, with major dependence on irrigation, have had relatively constant acreages of cropland used for crops and are typically less affected by Federal diversion programs. These regions have only limited acreage in noncropland uses with a high potential for cropping. Also, most of the high-potential land in the Mountain and Pacific regions is currently classed as rangeland and would most likely be used to produce either relatively low-yielding wheat or sorghum, or higher yielding crops through irrigation at substantially higher costs—largely due to rising energy costs.

The Lake States' cropland acreage has been fairly constant even though significant acreages of potential cropland still remain. About one-third of its high-potential cropland is currently forested, making it unsuitable for rapid conversion

to cropland. In the Lake States, most of the higher potential cropland is likely to be found in corn-growing areas and could be used for corn and soybean production.

Overall, the most likely sources of additional cropland seem to be the Corn Belt and Delta regions, the locations of much of our new cropland in recent years. This land would likely be used to produce corn and soybeans. The Northern Plains and Southern Plains have considerable amounts of high-potential acreage but it is mostly in areas of marginal rainfall and would be best suited to wheat and sorghum production. Much of the increased wheat production would require development of 2 acres to get 1 acre of harvested wheat, the other acre being in cultivated summer fallow. High-potential land in the remainder of the country would either require considerable investment in clearing, draining, or irrigation, or would be relatively low yielding under dryland farming in semiarid areas. As a consequence, only a small portion of the potential cropland is likely to be converted to cropland use in the near future, unless the cost-price relationships for crop production shift significantly.

Economic Potential for Conversion

Whether and under what conditions farmers and other investors will seek to develop additional cropland tends to be problematic. Definitive data to permit an analysis of this question do not exist. Historical trends are of some value in this regard but conditions during the eighties under which land will be demanded and made available appear to be changing. Despite these problems, the question remains: what is the economic potential for cropland conversion? Therefore, we turn to a rather crude land supply relationship for the limited, but useful, insight that it provides.

An estimate of the acreage that could be expected to be converted to cropland under alternative economic conditions can be derived from this crude supply schedule for cropland. The supply relationship is based on opinions of SCS district conservationists and county agents in two different years when economic incentives for developing land were quite different. Information was obtained on the economic feasibility of converting noncropland to cropland from the Soil Conservation Service's 1975 Potential Cropland Survey and its 1977 National Resource Inventory Survey. In the 1975 survey, information on potential cropland was based on economic conditions in 1974, a favorable year for farmers in terms of price relationships—prices received relative to prices paid—that would encourage land development. In the 1977 survey, information on potential cropland conversion was based on economic conditions in 1976, a much less favorable year for encouraging land development. The ratio of prices received to prices paid was 117 in 1974 and 97 in 1976.² A linear supply schedule obtained by connecting these points

² These are not ratios of prices, per se, but of price indexes. Aside from any changes in productivity that may have occurred since the

were used to generate estimates of cropland potential for different price ratios (table 5).

Based on this supply relationship, it appears that with the 1979 price ratio—prices received to prices paid ratio of 97—there would have been adequate economic incentive to convert some 36 million additional acres of noncropland to cropland uses (table 5). With price relationships as favorable as they were in 1973, an unusually favorable year, when the prices received to prices paid ratio stood at 124, the conversion of 70 million acres might have been possible. The actual conversion in any given year depends not only on current profitability but also on expectations regarding continued profitability and the time horizon over which those who would invest in the development of cropland expect to receive an appropriate return on their investment.

It should be recognized, moreover, that a considerable stock of cropland pasture, not classified as cropland, was available for the production of crops in 1974. This land could be converted to cropland at a minimal cost. Having drawn on this stock now for several years and with the other constraints on land conversion, the supply relationship described above can

be viewed only as an approximation that perhaps tends to overstate the future responsiveness of farmers to land conversion incentives. This supply relationship, although not representing a true economic supply function for land, is useful, however, for a general evaluation of the magnitude of incentives required.

Water Use and Availability

Irrigation is used to reduce the risk of seasonal or prolonged drought and to ensure crop quality. Irrigation use has increased steadily over the years—some 25 percent of the value of all crops now produced in the United States is from irrigated production involving nearly 12 percent of all cropland.

The use of irrigation has been expanding by between 1 million and 1.5 million acres per year over the last 5 years, and is expected to continue to grow at that rate for the next 5 years. The future rate of increase will depend mainly on the relationship between commodity and input prices, especially energy.

Irrigated acreage rose steadily from 18 million acres in 1939 to over 41 million acres in 1974; estimates of irrigated acreage in 1980 range from 45 million to 60 million acres. Nearly 90 percent of the total irrigated acreage is located in 17 Western States. Until the sixties, sprinkler irrigation was used almost exclusively on high cash value crops such as tree fruits, berries, vegetables, tobacco, nursery stock, flowers, and turf. Since then, sizable acreages of corn, peanuts, and soybeans have been brought under irrigation in the East through the use of mechanical move systems. The Southeast and Delta States account for nearly 8 percent of the irrigated acreage. Growth of irrigation in these humid areas has been relatively recent.

The importance of irrigation in crop production varies considerably from State to State. Nearly 90 percent of the total value of crops in California were produced on irrigated land in the early seventies; over 80 percent in Utah, Idaho, New Mexico, and Wyoming; over 50 percent in Washington, Oregon, Colorado, Texas, and Florida; and nearly 50 percent in Nebraska. Nevada and Arizona have little nonirrigated cropland.

Agricultural use of water accounts for nearly 80 percent of all water consumed annually in the United States. However, irrigation is a relatively inefficient use of water; less than half of the water delivered for irrigation is actually consumed by the crops. The remainder is absorbed by weeds, oversaturates the soil causing drainage problems, or returns to the supply system for use at a downstream location.

Competition for water from nonfarm uses will probably increase in the eighties. Conflicts will be inevitable where scarce

1967 base year, these indexes offer only relative information on changes in prices received and in prices paid. A ratio of 97 in 1979, for example, implies only that prices paid rose faster than prices received since 1967. It says nothing about the net returns to farmers in any absolute sense. A ratio of less than 100 does not necessarily imply that prices received are failing to cover prices paid.

Table 5—Potential cropland under five price-cost assumptions

Region	Ratio of prices received by farmers to prices paid ¹				
	100	105	110	115	120
	<i>Million acres</i>				
Northeast	1.3	1.7	2.1	2.4	2.8
Lake States	2.6	3.2	3.7	4.2	4.7
Corn Belt	5.4	6.2	7.1	8.0	8.8
Northern Plains	5.6	6.5	7.4	8.3	9.2
Appalachian	5.4	6.6	7.7	8.8	10.0
Southeast	5.6	6.8	8.0	9.2	10.3
Delta	3.6	4.5	5.4	6.2	7.1
Southern Plains	5.7	6.6	7.5	8.4	9.2
Mountain	3.8	4.8	5.8	6.8	7.8
Pacific	1.8	2.1	2.4	2.6	2.9
48 States	40.8	49.0	57.1	64.9	72.8

¹ 1967 = 100.

Source: Based on information from the 1975 Potential Cropland Study and 1977 National Resource Inventory, Soil Cons. Serv., U.S. Dept. Agr.

water supplies are insufficient to meet all demands. These conflicts will intensify, particularly during periods of low water flow. Irrigation requirements for water can be expected to become even keener as coal and oil shale development increases. Shifts in the population to the South and Southwest will also cause increased competition for freshwater supplies.

Much urbanization in the West takes place in the valley bottoms on previously irrigated cropland. This requires that irrigated land be purchased to secure the water rights needed to supply water for the new residents. Interestingly, urbanization on such formerly irrigated farmland makes more water available for other uses because urban needs for water are lower per acre than for irrigation. In the process, however, farmland is removed from production. For some Western States, this may well mean a net decline in irrigated acres because of urbanization.

At the same time that agriculture is competing with urban users for water, the public is becoming increasingly concerned about water conservation and the protection of water quality to enhance its aesthetics and its use for recreation, fish, and wildlife. Legislation and regulatory programs now seek to restrict point and nonpoint pollution of water supplies. Still, irrigators may be reluctant to incur expenses for adopting conservation measures and good water management practices unless they can realize economic benefits, such as savings from using less energy.

The development of additional water supplies seems likely to slow in the eighties. Although private development will continue, public development of water supplies for irrigation will be limited. The focus will shift more to water recovery systems and increased use of sprinkler and drip irrigation. In general, there will be adequate groundwater development to more than offset any loss in water supplies throughout the eighties. For particular areas, such as the Great Plains, water availability could increasingly constrain the expansion of production.

Fertilizer Use and Availability

Fertilizer use in crop production has also increased sharply over the years. During the early thirties, only about a million pounds of the primary nutrients—nitrogen, phosphate, and potash—were being applied. Less than a third of the fertilizer applied was nitrogen.

By 1978, 20 million pounds of primary fertilizer nutrients—half of it nitrogen—were used in U.S. agricultural production. Nearly 30 percent of the nitrogen being used was in the Corn Belt, another 16 percent in the Northern Plains, and about 10 percent each in the Lake States, Southern Plains, and Pacific regions.

Fertilizer is widely used in agricultural production on nearly all crops and on about half of all the acreage of crops harvested. About half of the total fertilizer used in farm production is applied to four crops—corn, soybeans, wheat, and cotton. Higher fertilizer prices and concerns about the environment will, over time, increase fertilizer producers' and users' costs, but will also result in better placement of fertilizer and adoption of other practices that increase the efficiency of fertilizer use.

Fertilizer application rates are expected to continue to increase over time, but at a somewhat slower pace. In addition, except for corn, the proportion of acres treated will also continue to increase. Nearly all corn is already receiving fertilizer.

Consumption of fertilizer is expected to exceed current levels during the eighties. While most of the nitrogen and phosphate fertilizer will be supplied by domestic producers, lower cost ammonia production by some foreign suppliers could make the United States more reliant on imports of nitrogen. The increased consumption of potash could be satisfied through additional imports but American farmers will have to outbid foreign buyers.

The world nitrogen supply-demand balance looks favorable for the next decade, with nitrogen production capacity expected to rise above projected needs. This anticipated increase in capacity is based on being able to continue to buy raw materials at prices that do not rise much faster than inflation. There is ample capacity to produce phosphate fertilizer domestically for use in the United States and for export.

Generally, fertilizer supplies should be adequate for agricultural uses during the eighties. Domestic and world supplies of nitrogen and phosphate fertilizers should be adequate to meet demands at least through the next 20 years. Potash supplies are expected to be tighter in the short term, but there will be ample supplies after the middle of the eighties as Canadian expansions come on stream.

Anticipated higher fertilizer prices throughout the eighties could slow the increase in fertilizer application rates and add to farm production costs. Overall, however, the added productivity to be gained through even greater fertilizer usage seems likely to more than offset any increase in its cost. However, any decrease in fertilizer applications could lead to a greater land requirement over the next decade.

Pesticide Use and Availability

Pesticides now play an integral role in agricultural production. Fungicides and insecticides control diseases and insects that damage crops and livestock. Herbicides control unde-

sirable weeds and are a partial substitute for labor, fuel, and machinery. Other pesticides are used to fumigate the soil, defoliate plants, and control plant growth.

Application of pesticides now exceeds a million pounds annually. Farmers spend nearly \$3 billion a year on pesticides; this is about 3 to 4 percent of their variable production costs, on average. The proportion is much greater for some crops like cotton, peanuts, fruits, and vegetables. Nearly 60 percent of the 1978 expenditures for all pesticides was for herbicides to control weeds, about 30 percent was for insecticides, and less than 10 percent was for fungicides to control diseases.

Farmers are likely to continue to increase their use of herbicides even though 90 percent or more of the major crop acreage is already treated. Increases are expected because of higher annual usage rates, particularly if minimum tillage and other reduced tillage practices are adopted on a wide scale. However, rates of increase in the use of these chemicals should be well below those of the sixties and seventies given their already extensive use.

Fungicide and insecticide use is likely to increase much more slowly than the use of other inputs because of improved pest management practices, including the implementation of Integrated Pest Management (IPM) programs and the use of non-chemical controls for several major crops. Good management practices should increase the productivity gained through pesticide use. Reduced application rates should also be possible, thereby lowering overall pest control costs.

The availability of pesticides during the eighties should not limit agricultural production since the United States is a major world supplier of pesticides. There will be sufficient capacity to produce all the pesticides needed. Any limits on the availability of pesticides will most likely relate to regulatory requirements.

The extent of application will be conditioned, at least partly, by the cost of these inputs. Cost increases for pesticides could diminish their use, reduce crop yields, and increase the acres of cropland that would be needed to meet the demands of the eighties.

Potential to Meet Cropland Needs of the Eighties

The critical demand pressures that are anticipated for American agriculture in the eighties will originate in expanded exports and a growing emphasis on alcohol fuels. Working against the expansion of productive capacity will be the persistent loss of current and potential cropland to urban uses. The cropland implications of these demands are considered below.

Cropland Needs for Additional Exports

Cropland needed for additional exports depends on the amount of commodities involved—presently and over time. It also involves the productivity or yields realized with the land that is used. For this analysis, two growth rates in yields were assumed for the most important export grains and oilseeds. Based on these yield assumptions and projected exports, the additional cropland needed to meet an expanding export demand is estimated and the economic incentives needed to develop the additional acreage are discussed.

Projected exports of grains and oil crops for the early eighties (see the article by O'Brien earlier in this issue) translate to average annual growth rates ranging from 1.5 percent for soybeans to 4.9 percent for rice (table 6). Feed grain exports are projected to increase by 3.1 percent per year during the eighties. With a continuation of past linear trends in corn yields (corn being the chief feed grain), a growth rate in yields of 1.7 percent per year is projected. Corn yields would, therefore, average 118 bushels per acre by 1990. To meet export demand, the acreage of corn for export would, consequently, have to grow at 1.4 percent per year. Alternatively, if the growth rate in corn yields is only two-thirds of the linear trend—1.1 percent per year, a much more likely scenario—corn acreage would have to grow by 2 percent per year. In this latter case, the average corn yield would be 112 bushels per acre by 1990.

Based on more likely yield increases during the eighties, nearly 16 million acres more will be needed in 1990 than in 1979 to produce crops for export (table 7). Even with favorable yield increases, nearly 10 million acres more will be needed in 1990 than in 1979 to meet the projected increases in exports.

Most agricultural exports have involved crops, rather than livestock. If there were to be a shift in exporting more livestock and livestock products in the eighties, even more acreage would be needed (more acreage is required to produce the same number of calories from livestock and livestock products than from crops). Another possibility, however, is that with higher feed costs, livestock production might decline. Consumers could well choose to eat more fish and poultry, and less pork and beef if the prices of the latter were to increase significantly. Such a change in the level and mix of livestock products consumed would free up pasture land for use as cropland.

Cropland Needs to Produce Fuel

The additional cropland needed to produce alcohol fuel is estimated by assuming that corn will be used to make either half or all of the ethanol called for in the Energy Security Act of 1980. (As this publication was going to press, the future of the Alcohol Fuel Program was uncertain). The act

Table 6—Projected average annual growth rate of agricultural exports, yields, and acreages to produce for export, 1979 to 1990¹

Commodity	Exports ²	Yields		Acreages to produce for exports ⁵ –	
		Favorable ³	More likely ⁴	With favorable yields	With more likely yields
<i>Percent</i>					
Wheat	1.7	1.1	0.7	0.6	1.0
Rice	4.9	.3	.2	4.6	4.7
Feed grains	3.1	⁶ 1.7	1.1	1.4	2.0
Soybeans	1.5	1.2	.8	.3	.7

¹ Compounded annual growth rate.

² Growth rate calculated from changes in exports projected from 1979/80 to 1985/86 in O'Brien's article (table 8) elsewhere in this issue.

³ Growth rate calculated from linear trend projections, based on 1965 to 1979 data, from 1979 to 1985.

⁴ Growth rate two-thirds of the favorable growth rates.

⁵ Growth rate of acreages needed so that the projected acreages times the projected yields are equal to the projected exports.

⁶ Based on corn yields, the most important feed grain exported.

specifies that 10 percent of the gasoline consumed in 1990 shall be alcohol. If we assume that conservation practices will hold the consumption of gasoline at about current levels throughout the eighties—110 billion gallons per year—then alcohol production in 1990 will need to total 11 billion gallons. If half or all of the 11 billion gallons of alcohol production comes from corn, about 2.2 to 4.4 billion bushels of additional corn will be needed. If feed byproducts from alcohol production are assumed to just offset, on a protein-equivalent basis, the pasture that is lost to corn land development, 19.6 to 39.3 million additional corn acres beyond those for the increased export demand will need to be brought into production (table 8).

Alcohol production typically yields corn gluten feed and meal or distillers' grains, important byproducts with value as a protein source for feeding livestock. The extent to which they are available and their cost relate to the ethanol production and drying processes used. We assumed for this portion of the analysis that these alcohol feed byproducts could more than replace (on a protein equivalent basis) the pasture that is lost to corn production. This, in turn, implies that there will be some offset of soybean acreage through a substitution of the corn alcohol byproducts for soybean meal. If rather poor pasture was brought into corn production, the soybean offset could be as high as 80 percent. A more conservative estimate of 40 percent is used for our analysis.

Table 7—Projected export acreage for 1990, with two growth rates of yields compared with 1979 export acreage¹

Commodity	1979 export acreage ²	Projected export acreage needed in 1990—		Additional export acreage needed by 1990—	
		With favorable yields ³	With more likely yields ⁴	With favorable yields	With more likely yields
<i>Million acres</i>					
Wheat	41.91	44.76	46.75	2.85	4.84
Rice	1.30	2.13	2.16	.83	.86
Feed grains	28.34	33.02	35.24	4.68	6.90
Soybeans	38.96	40.49	42.07	1.43	3.11
Total	110.51	120.40	126.22	9.79	15.71

¹ Acreage projections based on growth rates of exports and yields, and acreages shown in table 6.

² Quantities exported in 1979 divided by the 1979 trend yield from 1965 to 1979.

³ Growth rate calculated from linear trend projections based on 1965 to 1979 data, from 1979 to 1985. Growth rate was applied to the 1979 trend yield annually to get the projected 1990 yield.

⁴ Growth rate is two-thirds of the favorable growth rate.

Table 8—Changes in corn and soybean acreages needed to produce the ethanol specified in the 1980 Energy Security Act, 1979 to 1990

Changes in acreages	Ethanol produced half from corn ¹		Ethanol produced all from corn ²	
	With feed byproduct offset ³	Without feed byproduct offset ⁴	With feed byproduct offset ³	Without feed byproduct offset ⁴
<i>Million acres</i>				
Corn	+19.6	+19.6	+39.3	+39.3
Soybeans	-7.8	0	-15.7	0
Total	+11.8	+19.6	+23.6	+39.3

¹ 5.5 billion gallons of ethanol produced from 2.2 billion bushels of corn.

² 11 billion gallons of ethanol produced from 4.4 billion bushels of corn.

³ Assumes 40 percent of the increase in corn acreage will be offset by reductions in soybean acreages; half of the byproduct will offset loss from pasture converted to cropland.

⁴ Assumes byproducts are the same as feed loss from pasture converted to cropland.

Based on the 40-percent reduction in soybean acreage, fewer total additional acres will be needed. To produce 5.5 billion gallons of ethanol, only 11.8 million additional acres will be needed if a soybean acreage offset is assumed. As noted above, when the pasture feed value loss is exactly offset by alcohol feed byproducts, 19.6 million additional acres will be needed.

Emphasis to date has been on the use of corn to make alcohol. Other crops might also be used but they too would require additional acreage. Forest products are an alternative source of alcohol fuel—including byproducts from lumber production, from forests that are now poorly managed, or from newly planted forests in areas where crop production is not a good alternative. These and other forms of biomass are expected to replace corn as the primary fuelstock in the nineties.

Cropland Needs for Additional Exports, Fuel Production, and Urban Uses

Major demands for cropland will come from increased exports, alcohol fuel production, and urban uses. If 500,000 acres of farmland are converted to urban uses each year, the total cropland that will need to be developed by the year 1990 can be estimated.³ To meet domestic and export food/feed needs, plus the corn needed to make 5.5 billion gallons

of alcohol, and the loss to urban uses, 33 million to 41 million more acres of cropland will need to be developed by 1990 than were used in 1979 (table 9). Of this total, 28 to 35 million acres will be used for crop production, raising the total acreage of principal crops being harvested in 1990 to between 376 million and 383 million acres (fig. 1).⁴

⁴ The increased cropland projected to meet domestic and export demands by 1990 is assumed to be met through higher yields and more acres. Some of the added cropland could be realized through double-cropping, however. In 1979, about 6 million acres were double-cropped.

Table 9—Changes in cropland development uses for domestic use, exports, and for urban uses with more likely yields, 1979 to 1990

Item	No grains used for fuel	Half of ethanol produc- tion from corn ¹	
		With feed byproduct offset ²	Without feed byproduct offset ³
<i>Million acres</i>			
Domestic use	0	11.8	19.6
Exports	15.7	15.7	15.7
Urban uses	5.5	5.5	5.5
Total	21.2	33.0	40.8

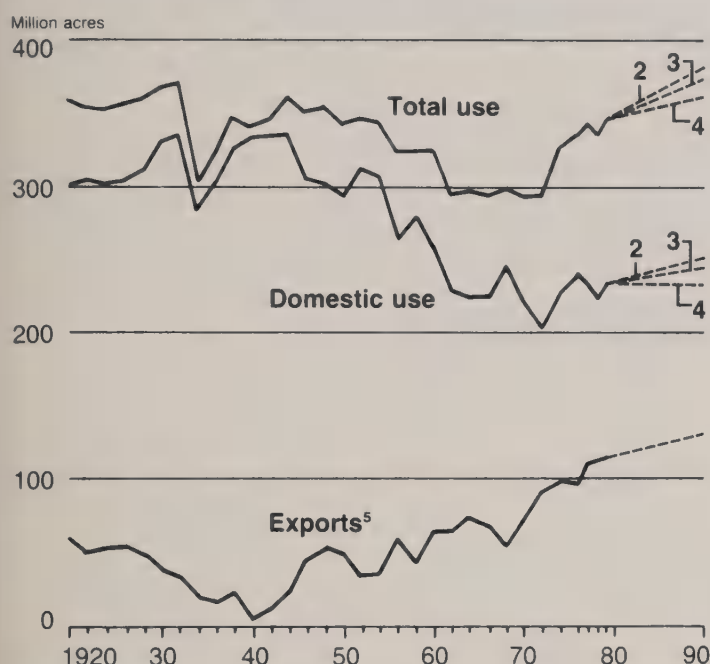
¹ 5.5 billion gallons of ethanol produced from 2.2 billion bushels of corn.

² Assumes 40 percent of the increase in corn acreage used for ethanol production will be offset by reductions in soybean acreage; half of the byproducts will offset loss from pasture converted to cropland.

³ Assumes byproducts are the same as feed loss from pasture converted to cropland.

Figure 1

Acreages of principal crops harvested for domestic use and exports of grains and soybeans¹



¹Projections based on anticipated demand and increases in yields that are two-thirds of the growth rate of the linear trends.

²Corn used to produce 5.5 billion gallons of ethanol with no allowance for feed byproducts.

³Corn used to produce 5.5 billion gallons of ethanol with some allowance for feed byproducts.

⁴No grains used for fuel.

⁵Exports of wheat, rice, feed grains, and soybeans.

Consistent with the price-cost relationships generated for table 5, 33 million acres of land will be brought into production throughout the eighties if the relation of prices received to prices paid attains a level of 95. This price relationship will prevail if the prices received for grain and the prices paid for production inputs increase similarly over the decade.

To get 41 million additional cropland acres during the eighties will require that the ratio of prices received to prices paid increases to 100. This will meet increased demands when feed byproducts are assumed to exactly offset the pasture lands that are converted to cropland. Such a price relationship will occur if prices received for grains increase faster than prices paid for production inputs.

To provide a basis for interpretation of these relative changes in index values, it is useful to consider the nominal commodity price increases that they imply. We assume for this

purpose that all prices will increase, on average, by the rate of inflation. At a projected inflation rate of, say, 5 percent, costs or prices paid would increase by 63 percent between 1980 and 1990. Thus, to maintain the 1980 prices received to prices paid ratio of 88, commodity prices would have to rise by a like amount. To encourage the development of 33 million additional cropland acres, a price ratio of 95 would be required and prices received would have to rise by 75 percent. The development of 41 million additional cropland acres by 1990 would require an economic incentive equal to a price ratio of 100; prices received would have to increase by over 85 percent. Such increases in prices received imply 1990 commodity prices of: \$6.16 to \$6.49 per bushel for corn; \$7.13 to \$7.51 per bushel for wheat; and \$15.14 to \$15.94 per bushel for soybeans.

It must be reemphasized, however, that the supply schedule utilized in this analysis is based on two points in time and the judgment of many individuals. The estimates provided are approximations and probably tend to overstate the responsiveness of new cropland development to changes in price relationships. The behavior being reflected relates, at least in part, to acreage that was classified as pasture, but that was in reality cropland pasture. And, even though much of the additional land we now have available could be economically developed, it is by no means certain that it will be developed. Additional incentives might be required to bring about the desired conversion.⁵ For these reasons, the estimates of commodity price increases needed to attract additional cropland development may well be conservative.

Conclusions

The productive capacity of American agriculture appears generally adequate to meet the increased needs for food, fiber, and fuel that are anticipated during the eighties. Such capacity will be brought to bear only if adequate economic incentive exists, however.

To meet the increased demands of the eighties, commodity prices will need to increase so that cost-price relationships are above what they are now. Only then will agricultural producers have adequate economic incentive to develop the additional cropland that will be needed.

⁵ About 7 million acres of land were brought into cropland use for crops between 1979 and 1980. These acres most likely came out of pasture and the stock of other high-potential land that was available. This increase should be kept in perspective, however. Overreaction to economic signals from the marketplace and vagaries of weather will cause land conversion to vary around the longer term trend that is projected. Our land capacity needs will continue, but the path of adjustment will be variable, not necessarily smooth. Just because a quarter or more of the additional acreage needed by 1990 is already in production in 1980 does not imply that prices received are adequate for any long-term adjustment. Moreover, the first acres brought into production are most likely the easiest, least costly to convert.

If yield increases amounting to two-thirds of trend and an alcohol fuel requirement of 5.5 billion gallons are assumed, some 35 million additional cropland acres will be needed to produce crops between 1979 and 1990. When a 40-percent offset in soybean acreage is assumed—due to corn gluten meal feed or distillers' grain production as a byproduct of alcohol fuel production—the total additional acreage needed between 1979 and 1990 will amount to 28 million acres. In both cases, a possible added loss of 5 to 6 million acres of cropland over the decade to urban uses must be considered in these land needs calculations.

To meet the various demands that will be placed on our cropland base by 1990, commodity prices will have to rise sub-

stantially above 1980 levels. An increase in the prices received to prices paid ratio from the 88 at which it stood in 1980 will be necessary—95 to attract 33 million additional acres and 100 to bring in 41 million more cropland acres. With a 5-percent inflation rate, commodity prices will have to rise between 75 and 85 percent to attract the additional cropland that will be necessary to meet domestic and global needs.

Again, these conclusions are based on a rather crude land supply relationship. The margin for error is significant. Still, the estimates incorporate plausible assumptions and provide a point of departure for further consideration of the productive capacity issue.

Global Prospects

Changes in the Farm Sector

Inflation

Capacity for Greater Production

Transportation

Transporting Food and Agricultural Products

William W. Gallimore*

Excluding the United States, world demand for food may outstrip world food production in the next decade. The United States will probably supply a large part of the shortfall in the eighties. As important as our ability to produce, however, is our ability to transport the food from the farm to the port. That capability depends largely on the existing transportation system, the amount and location of new lands to be brought under cultivation, and the adequacy (or existence) of transportation services to those new lands.

This paper describes the U.S. inland transportation system for agricultural products, identifies some problems now facing the system and those likely to emerge in the next 5 to 10 years, and provides a context for further assessing the system's performance. The major emphasis is on transporting and storing grains and oilseeds (which will probably form the bulk of the exports) and how increased exports will affect the system. Exports, which are expected to be 160 million metric tons in 1985 (up 12 percent from 1980), will likely be more variable than in the past decade and require more extreme shortrun adjustments in the system. The present transportation system should be adequate for handling the expected increase in grain exports, although ports may be more congested. There is excess capacity at some of the Great Lakes ports so more grain could move through the St. Lawrence River. Areas faced by rail line abandonments or lack of access to water transportation will have more intense problems. Storage capacity should not be a problem.

Much of the new acreage that will be brought into cultivation will likely be in areas of the country currently underserved by transportation. Seasonal demand and a general deterioration in rail service have typified the problems faced by shippers. Shipments of bulk commodities such as grain and soybeans have been hampered by rail abandonments and railcar shortages. The share of grain and soybeans shipped by rail declined from 53 percent of the total in 1968 to 49 percent in 1977, while that moved by barge increased from 13 to 24 percent. Barge shipments are especially important in

moving grain to the gulf and western ports for export, but restrictions on the Mississippi River (problems with locks) will constrain barging of grains so that rails may have to pick up most of the expected increase in grain movements to ports.

In general, main rail lines appear adequate with the exception of the Great Plains States served by the Milwaukee and Rock Island Railroads, which are bankrupt. The Interstate Commerce Commission has required interim (directed) service on much of these lines, but many producers will lose rail service as a result of these bankruptcies and as local branch lines are abandoned. Some shippers facing loss of service will have the option to shift to trucks, although trucking over long distances is generally more costly. Producers at the "end of the line" who will have problems getting railcars, or whose service is abandoned, will pay the highest price for transportation and will receive the lowest net price for their products.

Transportation of Food and Fiber

The U.S. transportation system, including waterways, railroads, airlines, highways, and pipelines, carried about 2.4 trillion ton-miles in 1978, up almost 32 percent from 1969 (table 1). Railroads accounted for 35 percent of the shipments, trucks and pipelines about 25 percent each, and barges 15 percent in 1978. Modal shares of intercity traffic have shifted somewhat during the past 30 years. Since 1950, trucks and pipelines have gained slightly. The share moving on inland waterways has remained about the same, while railroads have lost traffic (fig. 1).

Shipments of unprocessed farm products, including grains, soybeans, fruits, vegetables, and other similar products, totaled 493 million tons in 1977, up from 377 million tons in 1968. Rail carried 31 percent of these unprocessed products in 1968, but rails' share had dropped to 25 percent by 1977. The share moved by barges increased from 6 to 9 percent and that by trucks increased from 63 to 66 percent. Grains, soybeans, fruits and vegetables, livestock, and poultry account for almost 70 percent of the shipments of unprocessed products.

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Table 1—Intercity freight movement, by mode

Year	Motor trucks ¹	Railways ²	Inland waterways ³	Pipelines	Airlines	Total
<i>Billion ton-miles</i>						
1950	172.9	596.9	163.3	129.2	0.300	1,062.6
1955	223.3	631.4	216.5	203.2	.490	1,274.9
1960 ⁴	285.5	579.1	220.3	228.6	.890	1,315.3
1965	359.2	708.7	262.4	306.4	1.910	1,638.6
1966	380.9	750.8	380.5	332.9	2.252	1,747.4
1967	388.5	731.2	281.0	361.0	2.592	1,765.0
1968	396.3	756.8	291.4	391.3	2.900	1,838.7
1969	404.0	774.0	302.0	411.0	3.200	1,894.0
1970	412.0	771.0	319.0	431.0	3.300	1,936.0
1971	445.0	746.0	315.0	444.0	3.500	1,954.0
1972	470.0	784.0	338.0	476.0	3.700	2,073.0
1973	505.0	858.0	358.0	507.0	3.950	2,232.0
1974	495.0	852.0	355.0	506.0	3.910	2,212.0
1975	545.0	759.0	342.0	507.0	3.730	2,066.0
1976	510.0	799.0	373.0	523.0	3.900	2,209.0
1977	561.0	831.0	375.0	560.0	4.180	2,331.0
1978 ⁵	609.0	872.0	389.0	583.0	4.720	2,457.7

¹ Rural-to-rural movements and deliveries within cities are omitted.

² Revenue ton-miles.

³ Excludes coastwide and intercoastal ton-miles.

⁴ 1960 and later years include Alaska and Hawaii.

⁵ Estimated.

Source: Interstate Commerce Commission, American Trucking Association, and Transportation Association of America.

Semiperishable agricultural products, those requiring a minimum amount of special equipment and handling, include such products as grains, oilseeds, cotton, and tobacco. Railroads' share of the grain and oilseed shipments declined from 53 percent in 1968 to 49 percent in 1977 (fig. 2). The share shipped by barge increased from 13 to 21 percent during this period and is important in the movement of grain to gulf ports.

Perishable products like fresh fruits and vegetables, poultry, and livestock require various degrees of special handling and in most cases special transportation systems and equipment. Trucks, because they generally provide quicker service, carry most perishable products, rails a small percentage of the fruits and vegetables, and barges no perishables. Restrictions on the length of time that livestock can be transported without rest and feeding have made it difficult for railroads to recapture this market from trucks.

Many processed agricultural products are perishable or semiperishable. Red meat and poultry, which are processed but still usually retain their identity, are perishable and must be moved rapidly through the marketing system. Total ship-

ments of fresh meat increased from 18 million to 20 million tons during 1968-77. During that time, the amount shipped by rail declined from 21 to 2 percent, with trucks carrying 98 percent in 1977. Neither meat nor ready-to-cook poultry use inland water transportation.

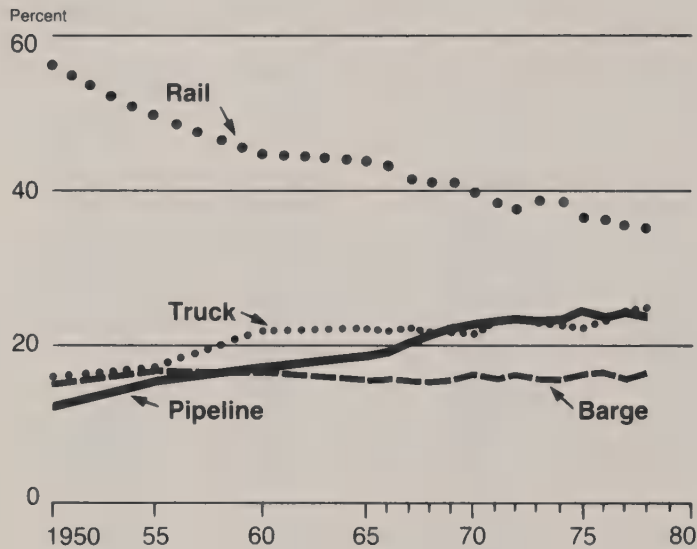
Rail remains the dominant mode for shipping frozen fruits and vegetables, but its share declined from 85 percent of the total in 1968 to 70 percent in 1977, with trucks capturing the rails' lost share.

Transportation in the Eighties

How can the transportation system be expected to perform in the eighties? It is highly probable that both the production and export of agricultural commodities will increase. Exports of grain and soybeans are expected to reach about 160 million metric tons by 1985, an increase of 12 percent over 1980, and will increase the demand for transportation. Export demand is also expected to be more variable than in the sixties and early seventies.

Figure 1

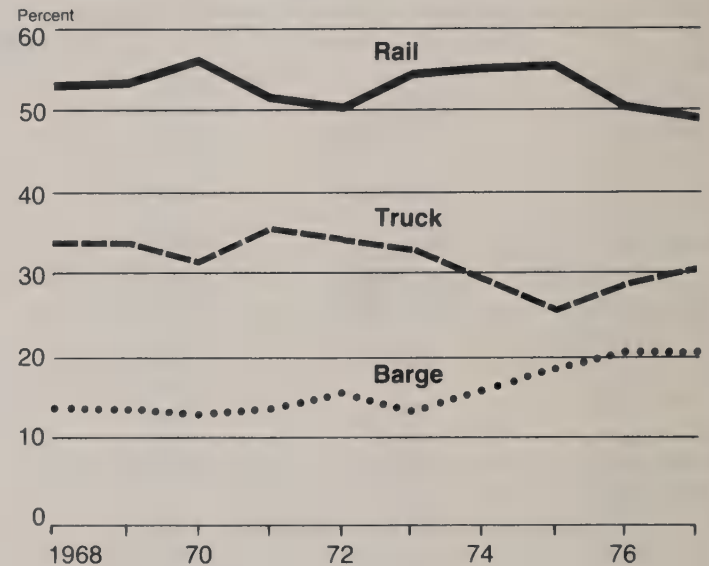
Total intercity movement of freight, by mode



Source: Interstate Commerce Commission, American Trucking Association, and Transportation Association of America.

Figure 2

Transportation of grains and soybeans, by mode



Source: U.S. Department of Agriculture, Interstate Commerce Commission, U.S. Army Corps of Engineers.

The effects of increased export demand on transportation depend to some extent on the countries or areas generating the increase in demand, the regions in the United States producing the necessary increase, and the type of commodity demanded.

World economic conditions will not likely result in great changes in pattern of demand for U.S. grains and soybeans from now through 1985. Demand for grain and other agricultural commodities, however, is expected to increase fastest in petroleum-exporting countries and selected high-growth developing countries. The recent 5-year agreement on grain shipments to China will probably increase the quantities of wheat moving through west coast ports.

Regional production patterns are not likely to be significantly altered in the next 5 years. About 9 million acres of the most promising land for conversion to cropland is located in the Corn Belt and Delta regions with additional lands available in the Northern Plains and the Southeast.

Taken together, world demand and the location of new production in the United States should not appreciably alter the shipping pattern of grain and soybeans moving to export markets. Production will be increasing in regions where a transportation system already exists, but the increased de-

mand will put additional strain on a system that does have problems.

The inland waterway system has been a bright spot in the movement of grain to ports for export, but the large increase in barge shipments between 1970-79 appears unsustainable because of constraints in the system. Currently, lock and dam no. 26 located below the confluence of the upper Mississippi and Illinois Rivers poses the greatest constraint to the upper Mississippi River system. This lock will reach its capacity within the next year or two, thereby constraining the growth of approximately three-fifths of all U.S. barge shipments of grain and soybeans. After many years of litigation, construction work has begun on a replacement structure, but this project will not be completed for 8 to 10 years. Temporary delays will be experienced on the Columbia and Snake Rivers due to repairs on three locks but capacity on the system should not be reached until the late eighties. The Welland Canal in the Great Lakes system also presents a longer term capacity problem. Capacity for this system will be reached around 1986 which will limit future exports from the Great Lakes port area. (5).¹ Barges will not be able to

¹ Italicized numbers in parentheses refer to items cited in the Reference Section at the end of this article.

keep pace with the increase in transport demand and their share of grain transportation will decline.

Truck transportation faces two major problems: increases in fuel costs affect them more than any other mode, and the road and bridge system is inadequate in some areas. In January 1980, fuel was about 11 percent of total railroad cost compared with an estimated 28 percent for trucks. Increased diesel fuel prices and possible shortages may cause some shifts of traffic from trucks to railroads.

While there may be some shift of farm product and processed food traffic from trucks to railroads because of higher fuel prices, the shifts will be limited by other factors. For example, some 65 percent of all U.S. communities did not have rail service as of June 1978 (7). With further railroad bankruptcies and rail line abandonments, this percentage will increase. The perishability of many farm products, the short distance for many shipments, and the financial conditions of many railroads, which limits the service that they can provide, will limit the shift of traffic from truck to rail. Trucks, however, are not expected to increase their share of long distance hauling of commodities like grains and soybeans.

The burden of moving the expected increase in agricultural products for export will fall on the railroads. The problems facing railroads are many. Continued financial problems are likely to result in more bankruptcies and mergers. Rail line mileage will be reduced in the process. Branch lines will continue to be abandoned as railroads seek to improve efficiency and increase profits. Many lines are poorly maintained and trains can move only at reduced speeds, further reducing the system's capacity.

The demand for train transportation varies with the harvest season, with added demand generated by fluctuations in exports. Shortages of railcars at harvest have been a constraint, but production of covered hopper cars is not a limiting factor in meeting agriculture's demand for rail transportation. The problem is complex and is related to revenue generated and other factors. The number of narrow door boxcars available for hauling grain is decreasing with the switch to large hopper cars but many shippers are located on light density lines which will not accommodate the large cars.

Agriculture shares the rail system with other sectors of the economy. Rail is expected to haul larger quantities of coal in the years ahead as coal is substituted for oil in powerplants. There will not be as much slack in the total system as there was in 1973 when coal hopper cars were pressed into service to haul grain.

As of January 1, 1980, after a period of large stock accumulations, aggregate storage capacity seemed to be adequate (table 2). Total capacity utilization at the national level was 65 percent but ranged by State from 37 percent (Texas) to

81 percent (Iowa). Total onfarm storage capacity utilization was 69 percent, or 4 percent greater than total capacity utilization. Onfarm capacity utilization by State ranged from 28 percent (Texas) to 89 percent (Ohio). Although aggregate capacity appears adequate, spot shortages have developed in the past year due to rapid harvests, large carryover stocks, or transportation shortages.

Most stocks appear to be located in the major production States and therefore require long-haul transportation to supply the major domestic demand markets and the export demand markets. The location of storage stocks near point of production reduces peak demands for transportation during harvest but not during surges in exports.

Port capacity will probably not limit exports during the eighties but the situation could change. Several factors can limit the continued increase in capacity of U.S. grain and soybean export facilities—high interest rates, limited funds for capital improvements, labor unrest, weather conditions, and the condition of the internal transportation system are a few.

In the past, labor strikes at port facilities have seriously affected exports of grains and soybeans through some port facilities, and labor disruptions will likely occur from time to time in the years ahead. Heavy freezing conditions can shut down the locks and channels and curtail the amount of grains and soybeans that can move from lake ports. Freezing conditions may also close the upper Mississippi River system and prevent the movement of grain and soybeans barged to export points.

Problems of the internal transportation system can interrupt the scheduled flow of grain to ports and affect the efficiency of port facilities. These include constraints on the waterways and various problems of railroads such as railcar shortages, the bankruptcies of some railroads, and the shortage of fuel.

Status and Problems of the Transportation System for Agriculture

The U.S. transportation system consists of the major modes of transportation plus the port and storage facilities. While each mode competes with the others for its share of freight, the various modes are complementary and essential parts of the overall system. Modal characteristics make each well-suited for shipments of certain products or commodities. Trucks, because of their speed and flexibility, have inherent advantages over rail and barges for certain products, while the low cost of barge shipments make them attractive for bulk commodities where time is not particularly important. Storage, though often overlooked in descriptions of the system, makes the spreading of shipments over time possible. And no overview of the agricultural transportation system would be complete without a discussion of port facilities and ocean shipping.

Table 2—Total U.S. storage capacity, stocks, and capacity utilization by farm and off-farm locations and selected States, January 1, 1980

State	Storage capacity			Stocks ²		Capacity utilization		
	Onfarm ¹	Off-farm ¹	Total	Onfarm	Off-farm	Total	Onfarm	Off-farm
	-----1,000 bushels-----			-----Percent-----				
Arkansas	65,419	211,820	277,239	31,751	87,979	119,730	48.5	41.5
Colorado	131,803	95,050	226,853	105,038	61,550	166,588	80.0	64.8
Illinois	1,211,991	825,190	2,037,181	946,902	580,911	1,527,813	78.1	70.4
Indiana	542,551	292,450	835,001	433,403	192,320	625,723	80.0	65.8
Iowa	1,633,561	705,150	2,338,711	1,359,654	536,344	1,895,998	83.2	76.1
Kansas	398,265	844,000	1,242,265	236,278	507,167	743,445	59.3	60.1
Kentucky	149,591	53,630	203,221	111,538	35,031	146,569	74.6	65.3
Michigan	202,678	98,000	300,678	172,344	66,237	238,581	85.0	67.6
Minnesota	1,346,775	392,800	1,739,575	838,649	260,745	1,099,394	62.2	66.4
Missouri	379,078	219,880	598,958	223,250	140,594	363,844	58.9	63.9
Montana	306,058	53,750	359,808	145,775	26,610	172,385	48.1	49.5
Nebraska	969,915	533,400	1,503,315	733,409	384,385	1,117,794	75.6	72.1
North Carolina	133,665	74,220	207,885	61,337	47,299	108,636	45.9	63.7
North Dakota	761,435	146,230	907,665	410,491	62,420	472,911	53.9	42.7
Ohio	313,227	272,330	585,557	278,196	184,592	462,788	88.8	67.8
Oklahoma	91,576	208,980	300,556	30,224	106,497	136,721	33.0	51.0
Tennessee	76,845	52,280	129,125	55,074	37,562	92,636	71.7	71.8
Texas	273,031	760,240	1,033,271	76,890	300,860	377,750	28.2	39.6
Washington	65,195	191,090	256,285	31,886	99,805	131,691	48.9	52.2
Wisconsin	428,536	129,370	557,906	292,976	73,016	365,992	68.4	56.4
Total, 20 States	9,481,195	6,159,860	15,641,055	6,575,065	3,791,924	10,366,989	69.4	61.6
U.S. total	10,923,585	7,120,540	18,044,125	7,496,133	4,280,802	11,776,935	68.6	60.1

¹ U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, *Grain Storage Capacity Survey*, Oct. 1978. Also updated from ASCS farm storage loans as of Aug. 1979.

² Stocks include feed grains, wheat, soybeans, rye, and flaxseed.

Rail Transportation

Rail is still the primary mover of bulk products such as coal and agricultural commodities, including grains and oilseeds. During 1978, the Class I railroads moved 1.8 billion tons of freight, but rails' share of freight movement has steadily declined during the past 30 years.²

Approximately 7 percent of the 1978 railcar loadings were unprocessed farm products and almost 85 percent of the unprocessed farm products were grain and soybeans. In 1978, 15 percent of the grain and soybean loadings were boxcars and 85 percent were covered hopper cars. Increased use of 100-ton covered hopper cars increased the average carload size from 2,500 to 3,500 bushels between 1974 and 1978.

It is difficult to isolate the factors that contributed most to the decline in rails' share of freight movement and to their financial problems. Reasons often cited include poor management, competition from trucks and water carriers, and economic regulations that prevented railroads from competing effectively. Rail service has declined in some areas as a result of rail bankruptcy. Lines have been abandoned or poorly maintained, frequency of service has been reduced, and there have been shortages of railcars, especially during peak harvest months.

The bankruptcies of the Rock Island and Milwaukee lines will likely cause at least temporary transportation disruptions in Montana, South Dakota, Minnesota, Iowa, Kansas, and Oklahoma during the eighties. Portions of the track of these railroads will probably be sold to other railroads, to State governments, and others, but some of the track will not be bought or kept in service.

Prospective rail line abandonments in March 1978 represented about 10 percent of the 197,000 miles of Class I rail line in service in 1975. The ICC permitted 3,210 miles of branch lines to be abandoned in 1979. Of the 4,689 miles listed as pending abandonment at the end of 1979, 2,297 miles were returned to the courts handling the bankruptcies of the Milwaukee and Rock Island Railroads. Abandonment was denied on only 780 miles in 1979, indicating that it has not been difficult to make a case for rail abandonment.

The majority of the track abandoned or under consideration for abandonment carries a low volume of freight and is in relatively poor condition. Abandonments tend to improve the efficiency and profitability of the individual railroad operations as revenue from the more profitable operations is not used to subsidize marginal lines. So far relatively few

business failures have been caused by branch line abandonments, but as more of the less marginal lines are abandoned, the situation may change.

The adverse effects of abandonment on shippers depend largely on the availability of alternate modes and the quality of prior service. In many instances, service was already so poor that abandonment had little effect.

Inadequate rail service and abandonment has adversely affected grain producers in areas heavily dependent on railroads to move grain. Local prices are based on the futures price for grain minus a difference (called the "basis"). Producers farthest from ports or domestic delivery points are normally expected to have the widest basis. But inadequate transportation which makes it difficult to guarantee delivery or even move grain at all can cause the basis to widen beyond what is expected. In 1979, the basis in many areas with inadequate transportation service and higher rates widened beyond historical levels, and beyond levels which could be explained by interest and storage costs. By some reports, there were periods when no firm local bids were offered for grain.

Some areas may lose significant rail lines through bankruptcy or abandonment. In cases where vital rail services are lost and access to water or trucks is absent or infeasible, it may be necessary to reinstitute service through cooperative or public ownership of certain parts of the system. In South Dakota, for example, the State purchased major segments of the core system previously operated by the Milwaukee Railroad and will operate it to provide a minimum level of service.

Efficiency in use of fixed equipment is a major challenge faced by railroads. Seasonality of demand for hauling grain has led to capacity problems over time. In 1979, the low in car loadings was 20,586 in February, with a high of 32,550 in November for a difference of 58 percent from the low to high month. Railroads cannot maintain a fleet to handle peak demand and have cars idle several months of the year.

One way of improving the efficiency of car use would be to improve the turnaround time. In 1978, the narrow door boxcar was used an average of 10.1 times, indicating a turnaround time of 36 days for each trip. The covered hopper cars were used an average of 13.7 times for a turnaround of 27 days. The average turnaround time for railcars has remained fairly constant for the past several years.

Rail rates are regulated for most freight other than fresh fruits and vegetables. Railroads have asserted that rate regulation has prevented them from being competitive with other modes. Authority to change differential rates based on multiple-car use and unit trains has been granted, and has enabled railroads to improve their efficiency in moving grain.

² Class I railroads are those with annual gross revenues of \$50 million or more.

This flexibility has resulted in the development of a system including large subterminal elevators that enabled railroads to meet the transportation demands from increased exports.

Truck Transportation

Trucks play an important role in the movement of agricultural and food products. Most farm products, both perishable and semiperishable, move by truck from the farm to at least the first point in the marketing chain. Food distribution is almost exclusively by truck from the wholesalers' warehouses to retail and other food outlets. In 1977, there were approximately 26 million trucks in the United States, of which 3.5 million were used primarily to haul farm and forestry products and processed food.

The capacity of the trucking system is a function of the number of trucks and the extent of the road system. There were 3.9 million miles of roads and streets in the United States in 1978, an increase of about 4 percent from 1970, with about 82 percent of the roads and streets in rural areas. By 1978, some 39,400 of the 42,500 miles of interstate and defense highway system had been completed.

The interstate system has played a very important part in the increase in longhaul trucking that has taken place in recent years. Although not yet completed, much of the system needs repair. A 1977 national bridge inventory, reporting on 234,000 bridges on the Federal aid system (primarily those roads built with Federal assistance), found 7,000 to be structurally deficient and 26,500 to be functionally obsolete (14). In addition, an estimated 72,000 bridges on nondesignated Federal aid roads were structurally deficient or functionally obsolete.

Data through 1978 indicate that funds for highway expenditures were adequate, but more of the burden for financing rural secondary roads has fallen on State and local governments. Funds are difficult to obtain for secondary rural roads because many have been removed from the Federal aid system, and other funding sources such as State fuel taxes have failed to keep pace with inflation. Thus, new sources of financing rural roads and bridges will be needed to maintain and improve rapidly deteriorating secondary rural roads. The Federal road system, funded by Federal gasoline taxes, will also need new sources of funds if fuel consumption levels off or declines and the tax rate is not changed.

Costs of operating trucks for hauling farm products and processed foods have increased substantially as a result of fuel price increases. Costs of operating refrigerated trucks for hauling fresh produce increased 55.3 percent between June 1976 and January 1980, over half of it after January 1, 1979. Fuel prices were the leading factor in increasing truck costs during 1979; fuel accounted for 20.5 percent of total

cost per mile in January 1979 and had risen to 29 percent by January 1980. All other cost factors increased by about 9 percent during the same period. Diesel fuel prices paid by independent truckers increased by 114 percent between June 1976 and February 1980 with about two-thirds of that increase occurring after January 1, 1979 (2, 3, 6). Rates paid for shipping fresh fruits and vegetables increased by only 10 to 15 percent during 1979. Thus, truckers hauling these commodities were caught in a price squeeze that could result in business failures and fewer independent truckers available to haul these commodities in the future.

Federal, State, and local regulations affect the performance of for-hire truckers hauling farm products and processed foods. Unprocessed farm products are exempt from economic regulation and the exemption provides much needed flexibility for shippers of farm products. Regulation of most other products, however, creates some inefficiencies for haulers of exempt products. Truckers hauling exempt products generally have to lease their equipment to a regulated carrier in order to return with a load. Trucking was partially deregulated in July 1980. The law has the following provisions:

- It broadens the agricultural exemption.
- It permits backhauling of regulated commodities by independent truckers when they haul exempt commodities on their initial haul, if certain provisions are met.
- Shippers and receivers can no longer require a trucker to provide loading or unloading without full compensation for these services.
- The ICC will require written contracts for interstate movement of exempt commodities.
- It increases the amount of nonmember regulated traffic that an agricultural cooperative may haul for hire.
- It removes ICC jurisdiction over intercorporate hauling, within certain limitations.
- It reduces the restrictions on contract carriers as to the number of firms served and the geographic area served.

Varying weight and length restrictions imposed by different States affect truckers of farm products. As of March 12, 1979, 11 States and the District of Columbia imposed a gross weight limit of 73,280 pounds or less on their interstate highways, and 23 States allowed only a maximum length of 55 feet for a tractor and semitrailer combination. The Rural Transportation Advisory Task Force has recommended that States with less than 80,000-pound gross weight limits and vehicle length limits of less than 65 feet increase their maxi-

mums up to those limits on interstate and other major highways (9). The task force proposed that those recommendations be encouraged through incentives developed in conjunction with a recommended revised Federal role in maintaining interstate and other major highways.

Inland Water Transportation

The inland water transportation system is an important link in our total transportation system (table 3). In 1979, the inland waterway carriers transported nearly one-fifth of the total grain and soybeans and about one-third of grain and soybean exports. Shipments of grain and soybeans on the inland waterways increased by 91 percent between 1970 and 1976, largely because of the dramatic increase in exports. However, between 1976 and 1979, shipments increased by only 1 percent. Barge shipments of corn have increased steadily since 1970, but shipments of other grains and soybeans have increased more erratically.

As of 1979, there were slightly over 25,000 miles of commercially navigable inland waterways in the United States which were operated, maintained, and improved by the Federal Government. The Mississippi River system and the Columbia and Snake Rivers system are located within the major agricultural regions of the Midwest and Northwest, respectively. The Mississippi River system and Gulf Coast waterways comprised slightly over half of the total waterway system's mileage. Most U.S. grain and soybeans are produced in States that border the Mississippi River system or its tributaries. Nearly three-fourths of all grain and soybeans sold off-farm were produced in just 13 States in 1974 (4).³ The Columbia and Snake Rivers system provides water transportation for the wheat and barley produced in the Northwest.

Table 3—Grain and soybean shipments by barge

Year	Commodity				Total
	Corn	Wheat	Soybeans	Other	
Million bushels					
1970	404.2	136.0	271.2	32.8	844.2
1971	332.7	79.3	218.4	35.6	666.0
1972	506.4	130.0	260.0	79.9	976.3
1973	627.2	77.0	255.3	16.4	975.9
1974	577.8	147.4	291.1	15.6	1,031.9
1975	681.7	221.1	275.7	16.5	1,195.0
1976	893.1	345.0	351.7	21.7	1,611.5
1977	823.9	336.9	342.0	19.4	1,522.2
1978	874.5	323.0	413.0	18.0	1,628.5
1979	934.7	323.5	345.4	19.0	1,622.6

Source: U.S. Department of Agriculture, Agriculture Marketing Service, *Grain Market News*, various issues.

Maintenance, improvements, and operations of the inland waterway system have been provided by the Federal Government at no direct cost to the water carriers. The Government spent an estimated \$14.7 billion on the maintenance, improvement, and operation of the domestic waterway system over the almost 200-year period between 1791 and 1975 (13). P.L. 95-502 of 1978 authorized the replacement of lock and dam no. 26 on the Mississippi and imposed a user charge on all commercial inland and intercoastal waterway navigation for the first time. On October 1, 1980, a 4-cent-per-gallon waterway users fuel tax was imposed and will be increased to 10 cents per gallon after September 30, 1985. This tax is not expected to result in any immediate diversion of traffic from barges.

The shipment of agricultural products by water provides a low-cost, energy-efficient means of transportation. Most agricultural commodities are carried by exempt for-hire or private barge carriers who are free to price their services according to supply and demand. Barge capacity appears to be adequate and is not expected to be a constraint in the next few years.

Barges generally have the lowest unit cost for long distance transportation and the greatest unit capacity (single or multi-barge tow) of all three modes. A 1,500-ton barge can carry the equivalent of 15 covered hopper railcars or 63 semitrailer truck loads. However, barge service is the slowest and least flexible service of any mode because it moves on water and is restricted to the inland waterways. Barge transportation consumes the least amount of energy per ton mile of any mode (12).

Potential constraints to the inland waterway system include obstructions to the waterway and faulty locks and dams. Obstruction of waterways is usually caused by weather, floods, low water, and icing, for example. Silting, which can reduce the depth of a river channel, may require regular dredging. Due to environmental concerns and general cost increases, the dredging process has become more costly.

Locks and dams can limit commercial navigation on the inland waterway system. The greater the number of locks and dams, the longer the time required to traverse a given river segment. A lock and dam temporarily closed for repairs increases the transit time or may halt traffic entirely.

Storage Facilities

Storage capacity is an essential component of the marketing system for grains and oilseeds. Production generally occurs once a year, but consumption is more uniform throughout

³ North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Wisconsin, Iowa, Missouri, Illinois, Indiana, Ohio, Oklahoma, and Texas.

time, necessitating storage. Storage capacity is located at the farm, nearby country elevators, country subterminal elevators, terminal elevators, domestic demand locations (processors and millers), and ports of export. At harvest, production can be stored on the farm, moved to nearby country elevator storage by truck or wagon, or sold and transported through the marketing chain to its destination. Local storage capacity, availability of transportation, current prices, and future price expectations are key variables in the farmer's decision to store or sell the grain. The transportation system's capacity is finite in the short run and country storage of grain can be a temporary substitute for transportation. Thus, strategically located storage capacity can relieve pressure on the transportation system caused by harvest pressures.

As of January 1, 1980, estimated total storage capacity was 18 billion bushels (see table 2) (10, 11). Slightly more than three-fifths of total capacity was located on the farm, 87 percent of it in 20 States. The remaining 7.1 billion bushels of total capacity was in off-farm locations. Export elevators accounted for approximately 336 million bushels of off-farm storage capacity and the remaining 6.8 billion bushels were divided between country elevators, country subterminal elevators, terminal elevators, and domestic demand locations. As with the onfarm capacity, 87 percent of the off-farm capacity was located in 20 States.

Storage capacity more than doubled in the seventies. While both farm and off-farm storage capacity increased, most of the increase was onfarm. Onfarm capacity grew from 3.1 billion bushels in 1971 to 10.9 billion bushels in 1980. The growth in off-farm capacity was 25 percent or 1.4 billion bushels between 1971 and 1980. The growth in onfarm storage capacity was so great that its share of total capacity increased from 36 percent in 1971 to 61 percent in 1980. Several factors were probably responsible for the large growth in farm storage capacity, including increased crop production, insufficient transportation capacity, and farm storage facility loans in conjunction with the 1977 Food and Agriculture Act (8).

Most longer term storage of feed grains, wheat, soybeans, rye, and flaxseed is generally in farm or country elevator storage facilities. Some terminal elevator facilities located in Chicago, Minneapolis, and Kansas City may also store for a longer period. Quantities stored for an intermediate time tend to be located at the domestic demand points. Storage facilities at most port elevators and many river terminal elevators are not used for long-term storage. Their primary function is that of a short-term working inventory.

As of January 1, 1980, total storage stocks of feed grains, wheat, soybeans, rye, and flaxseed were 11.8 billion bushels, with slightly more than three-fifths of these stocks in farm storage. Most of the off-farm stocks were probably in country elevator or terminal facilities.

An estimate of transportation requirements at time of harvest can be determined by adding current stocks and production and subtracting farm and country elevator storage capacity. The residual indicates the amount of remaining storage capacity or the amount requiring transportation. Since the only data available are farm storage capacity, a ratio of farm storage capacity to total production was constructed for 20 States and the U.S. total. This ratio reflects the amount of farm storage capacity per bushel of production. A high ratio suggests less need for transportation requirements at harvest. During the past 9 years, the farm storage capacity/production ratio increased at the national level. In 1971, the ratio was 0.29, but increased to 0.78 by 1979.

During 1979, the farm storage capacity/production ratio at the State level ranged from 0.36 to 1.87. Arkansas had the least amount of storage capacity for each bushel of production (0.36); North Dakota had the most (1.87). States located farthest from major domestic markets or ports of export had the largest farm storage/production ratios of the 20 States.

Port Capacity to Handle Grain and Soybean Exports

Exports of grains and soybeans rose by 150 percent from 1970-79. While year-to-year increases were slower in the late seventies than during the early and midseventies, they continued to increase at a substantial rate each year. During this 10-year period, feed grain exports increased by 247 percent, wheat by 189 percent, and soybeans by 175 percent.

All port areas increased their exports of grain and soybeans between 1970-79 (table 4). The Atlantic ports increased exports by 474 percent, while the Lake ports had an increase of only about 60 percent. Grain and soybean exports went from 6 percent of all exports at the Atlantic ports in 1970 to 13 percent in 1979, increased from 14 to 15 percent at Pacific ports, declined from 63 to 61 percent at Gulf ports, and declined from 18 to 11 percent at Lake ports.

The capacity of ports to export grain was estimated by two methods. The first used the engineering approach to estimate the loading capacity per hour, week, and year. The second approach used the actual peak month of loading to estimate capacity for several years. Total loading capacity in 1979 based on engineering figures was 8,207 million bushels for all U.S. ports, indicating that U.S. ports handled about 56 percent of their rated grain and soybean export capacity in 1979. Exports could increase by about 80 percent over 1979 levels with the current port capacities.

Yearly export capacity, estimated from peak month loadings for U.S. grain and soybean export facilities, increased from 2.5 billion bushels in 1970 to 5.9 billion bushels in 1979. During this same period, inspection of grain and soybeans for export at U.S. ports increased from 1.8 billion bushels to 4.6

Table 4—Distribution of grain and soybeans exports by port area¹

Year	Port								Total ²	
	Atlantic		Gulf		Pacific		Lake			
	<i>Mil. bu.</i>	<i>Pct.</i>	<i>Mil. bu.</i>	<i>Pct.</i>	<i>Mil. bu.</i>	<i>Pct.</i>	<i>Mil. bu.</i>	<i>Pct.</i>	<i>Mil. bu.</i>	<i>Pct.</i>
1970	102	6	1,147	63	257	14	320	17	1,826	100
1972	227	10	1,501	65	254	11	337	14	2,319	100
1974	362	13	1,885	65	361	13	272	9	2,880	100
1976	535	15	2,329	65	388	11	309	9	3,561	100
1978	508	12	2,617	62	517	12	555	14	4,197	100
1979	586	13	2,780	61	689	15	511	11	4,565	100

¹ Does not include rice.

² Totals do not all add due to rounding.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News*, various years.

billion bushels. In 1978, the year with the highest actual exports as a percentage of potential export capacity, the ratio for all port areas was 87 percent. For the Gulf, the port area having the highest ratio, the ratio was 93 percent. Grain and soybean exports have exerted considerable pressure on port facilities but new facilities and increased utilization have tended to provide adequate capacity.

In 1979, yearly port capacity for exporting grain and soybeans based on peak month loading equaled about 72 percent of engineering capacity. Actual loadings were 78 percent of peak month yearly capacity. Thus, both methods of estimating export capacity for port facilities indicate they should be adequate for future export needs.

Ocean Transportation

Freight-carrying ships can be classified as bulk carriers or as freighters. Bulk carriers are designed to carry either dry bulk cargo or liquid cargo. There are several classes of freighters including general cargo, full containership, partial containership, roll-on/roll-off vessels (for trailers), and barge carriers. Grain is hauled primarily on dry bulk carriers and on general cargo freighters.

The U.S. merchant marine fleet, 580 privately owned U.S. flag vessels, carried only 4.5 percent of all U.S. imports and exports in 1978. Although the United States is the world's single largest trading nation, accounting for approximately 25 percent of all international trade, U.S. ships carried less than 1 percent of that trade. U.S. agriculture depends primarily on ships of other nations to carry the export grains (1).

Ocean freight rate activity for heavy grains during 1979 was well above 1978 levels. Charter rates for the Great Lakes, St. Lawrence River, and Gulf ports during 1979 reached some of the highest levels in recent years. The rate escalations during

1979 reflected rising fuel prices, but more important, the increased export demand (table 5).

Transportation Issues and Policies

The basic transportation system cannot be altered very much in the next few years. The rail system is in place and major changes are long run rather than short run. But, the system can be adjusted. Increased use of multiple-car shipments, unit trains, and subterminal elevators should increase overall efficiency. Improvements in waterways are long-term projects, and only those already initiated will be operating in the early years of the decade. The basic highway system is in place, but some improvements could be made in the secondary road system. Planning and policy changes could affect the basic transportation system in the latter half of the decade. Rail, truck, and water transportation could be significantly altered by 1990 if conditions warrant drastic changes.

Policymakers are faced with three major issues affecting transportation in this decade: rising energy costs, deregulation, and determination of and planning for the transportation system. These problems are not unique to agriculture and must be faced as national issues. Yet they do affect agriculture and require both long- and short-term solutions.

The shortrun response on the energy issue will be to assure that in time of fuel shortages, transportation will be available to move the inputs necessary for agricultural production and to move food to consuming centers. In the long run, shippers will adjust to differences in costs of the various modes resulting from the increase in energy costs.

Deregulation in many instances will allow for greater efficiency and increased capacity utilization during the eighties. Greater flexibility for trucks to backhaul, and other provisions of the 1980 deregulation act should remove some of the artificial capacity restraints imposed on the system by

Table 5—Average quarterly voyage charter rates for bulk grains¹

Origin and destination	Flag	Year and quarter							
		1978				1979			
		1st	2nd	3rd	4th	1st	2nd	3rd	4th
<i>Dollars/metric ton</i>									
Great Lakes ports to:									
United Kingdom	For.	18.57	19.50	18.75	20.86	25.44	25.32	27.18	37.39
Antwerp-Rotterdam-Amsterdam	For.	15.12	17.47	16.91	20.34	19.53	23.04	23.55	32.71
West Germany	For.	15.03	18.37	16.91	21.73	19.73	22.48	23.83	36.68
St. Lawrence River ports to:									
United Kingdom	For.	6.20	9.21	5.82	9.70	10.08	15.92	15.33	16.65
Antwerp-Rotterdam-Amsterdam	For	5.80	8.04	2	8.82	10.00	11.85	15.33	13.65
West Germany	For.	6.88	10.75	2	2	2	14.18	17.83	14.61
U.S. Gulf ports to:									
Antwerp-Rotterdam-Amsterdam	For.	5.25	6.55	6.46	8.47	9.06	13.65	15.56	16.96
Japan	For.	9.86	13.06	13.66	12.98	14.97	24.39	24.56	25.33
U.S.S.R. (Black Sea)	U.S.	15.74	2	2	15.74	14.88	17.96	2	2
West Germany	For.	6.41	7.44	6.47	8.99	8.93	13.67	15.72	17.06
Italy	For.	13.86	16.97	11.31	2	22.23	2	2	2

¹ Average of rates for individual cargoes weighted by volume.

² None reported.

Source: Maritime Research, Inc.

regulation. Railroads are also likely to be deregulated to some degree in the near future. The ICC, through administrative procedures, has exempted some agricultural commodities, primarily fresh fruits and vegetables, from regulation. Legislation was passed in 1980 to reform the economic regulation of railroads. The legislation permits railroads more rate flexibility.

Rate flexibility could raise rates for some agricultural shippers. At the same time, some shippers and receivers could enjoy better and more frequent service. Small shippers with continuing rail service could face higher rates because the changes proposed make it more difficult to challenge rate making by the railroads. Deregulation could improve efficiency, but some shippers would lose services or face increased rates if they are captive to one mode of transportation.

In the absence of effective planning for agriculture's transportation needs, rail lines have been abandoned and the road system has been allowed to deteriorate so that in many instances trucks are not a viable alternative to the loss of rail service. A public policy choice between continued operation of the railroads through subsidization or funding improvements in the road system may be in the offing. An alternative may be a reorganized and more efficient core rail system supplemented by improved roads to permit trucking of grain and other commodities into large subterminal elevators. Re-

search is needed to determine what kind of system will best serve rural shippers' needs.

Problems exist now and action will have to be taken before longrun solutions can be planned and implemented. Increasing fuel costs, deregulation, deterioration of the rail and highway systems, and limits on the inland waterways point to an increase in problems faced by many agricultural shippers. The Rural Transportation Advisory Task Force in its final report recognized that the railroad was the keystone of the agricultural transportation network, and suggested several options for improving transportation service. These options included contracting for rail transportation, loans for rehabilitating rail lines, loans and other help for continuing certain branch lines threatened with abandonment, and establishing rural transportation cooperatives.

The task force and this paper have stressed the nature of transportation problems facing agriculture in this decade. The basic problem is to assure shippers of access to transportation at reasonable rates. Many shippers will not have this service unless specific programs are developed. To date, these policies and programs have not been defined. Agriculture's need for transportation should be well represented at all policy levels so that decisions affecting the total system will fairly consider its legitimate interests.

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Global Prospects

Changes in the Farm Sector

Inflation

Capacity for Greater Production

Transportation

Trade Issues

International Trade Policy Issues

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The coming decade is projected to be one of serious adjustments for the United States in its relationship to world agriculture, as noted by O'Brien in another article in this issue. Foreign demand for agricultural products expanded by 2.9 percent per year during the past three decades. O'Brien reports that despite slower population and economic growth, demand for agricultural products in the eighties is projected to expand almost as rapidly, while growth in production could slow compared to historical rates. If this materializes, the world would depend on the United States for 15 percent of its food and agricultural supplies by 1985, compared with 11 percent in the late seventies, and our agricultural exports would have to expand between 7 and 9 percent per year to meet that need.

As the importance of the export market for U.S. agricultural commodities grows in the eighties, the Nation will face several challenges and opportunities, chief among these being the U.S. policy response to foreign protectionism. The numerous protectionist policies by major importers have lowered prices received by U.S. farmers for their products and increased world price variability. The United States faces a choice in the eighties between continuing to pursue an open market policy, or redirecting the thrust of its policy by changing its market conduct to exploit its increased importance as a food exporter. Although an open market policy offers the potential for increased global welfare and expanded U.S. exports, farmers and consumers often believe that this policy subjects them to unnecessary price variability and exploitation by state traders. The tighter supply situation may mean increased interest in bilateral trade agreements, greater use of export embargoes, and attempts to weaken the link between U.S. and world prices.

These policy options may not be effective. Bilateral trade agreements may increase price variability. Export embargoes may be effective in the short run in stopping price increases, but at the cost of declines in farm prices and at the expense of the reliability of the United States as a food exporter. The implications of a U.S. export marketing board are not clear.

Such a board could mean fewer producer benefits and make prices more unstable. Establishing a U.S. marketing board with domestic and export authority would necessitate reorienting individual producer decisionmaking toward collective action. Farmers accustomed to making their own marketing decisions would have to market collectively with averaged pool prices and output quotas.

Another challenge facing the United States during the eighties is aid to developing countries. The growing share of world grain trade imported into developing nations and the increase in U.S. grain exports means that the United States will continue to help meet the food security needs of developing countries in the eighties. While the United States has proposed the Food Security Reserve (FSR) and continues to send P.L. 480 food aid shipments, plans for international control of grain reserves such as the Five Point Plan will continue to be considered. The United States will have an interest in designing food security policies and programs that promote a more equitable sharing of food aid responsibilities. Implementing an international food reserve plan will be difficult because of the conflict between domestic and international policy objectives.

This paper reviews the existing policy environment as the decade begins, and assesses the impact of these policies on the level and variability of U.S. grain and oilseed prices. We analyze proposals to counter foreign protectionist policies by reevaluating the current U.S. open market system and considering alternative policies designed to restrict U.S. participation in world trade. We also examine international actions that could counter protectionism and reduce price variability, such as the International Wheat Agreement negotiations and the Multilateral Trade Negotiations. Finally, we analyze several proposals to meet the food security and food aid needs of developing countries.

Protectionism in Grains and Soybeans Markets

Since the end of World War II, the goal of U.S. trade policy has been to achieve freer trade. This goal is based on two central themes of international trade theory: free trade maximizes global welfare (3); and free trade promotes price

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stability, since all nations share the burden of adjustments to shocks in the world economy (7).¹ These two themes have been embraced by U.S. agricultural producers, whose income depends heavily on export markets. Reducing agricultural protectionism would increase world trade in agricultural products, providing higher income to exporters and improved living standards to importers of food. A reduction in agricultural protectionism would also apportion the burden of adjustment necessary to accommodate the vagaries of weather among all market participants, and ease the cost of price instability borne by the United States.

Most trade policies arise from a desire to alter the existing distribution of income by manipulating the price of a basic food item or farm commodity. This price manipulation can be successful, but usually only if restrictions are placed on trade to prevent world market forces from eroding the distributional effects of the domestic policy. Thus, trade policies become interwoven with domestic commodity policies which are directed at the requirements of two broad, often conflicting constituencies—agricultural producers and consumers (3). Domestic policies of most countries tend to favor one group at the expense of the other. The high cost of these policies precludes taxpayer financing of both producer- and consumer-oriented policies simultaneously.

Policies designed to maintain or improve producer incomes frequently raise product prices, thereby stimulating production and dampening consumption. If surpluses develop, export subsidies or incentives are likely to be adopted. The developed economies of Western Europe, North America, and Japan are the primary users of such policies.

Countries adopting policies favoring consumers usually fix the retail price of one or more basic food items at below-market levels. These countries often attempt to hold down the cost of consumer subsidies by maintaining low producer prices. The result is pressure for larger imports (or lower exports) because domestic consumption grows while production growth is discouraged.

Both producer- and consumer-oriented policies distort market prices and divert the spatial distribution of global production away from its relatively least-cost location by giving artificial price signals to producers (8). Likewise, consumption patterns are also distorted as consumers in various countries adapt their diets to artificial price signals. Since these distortions impede the transmission of price information and incentives to the world's grain producers and consumers, countries with relatively low trade barriers bear a larger burden of the price adjustments necessitated by shifts in world supply and demand (7).

Efforts to reduce trade barriers and achieve freer trade in agricultural products have not been very successful. Protectionist policies reduce world prices and increase world price variability by shifting the burden of adjustment to fewer nations. Should other countries' trade policies continue to force the United States to bear a disproportionately large share of increasing world market fluctuations in the eighties, alternative marketing strategies would probably have to be considered.

The degree of protectionism currently facing U.S. agricultural exports varies greatly by commodity. World trade in grains is heavily influenced by protectionist policies, while world trade in oilseeds and oilseed products remains relatively unhindered (6).

Wheat and Rice

Rice and wheat are the two major food grains traded on world markets and share three characteristics that tend to increase their price variability. First, consumer discrimination among grain varieties results in less than perfect substitution between such items as soft wheat varieties grown in France and hard wheat varieties grown in Canada. Second, the response of food grain consumption to changes in incomes and prices is small and declines as income rises. Finally, consumption, production, and trade of wheat and rice, staples in diets throughout the world, are regulated by numerous national policies. As a result of these characteristics, small shifts in supply or demand in world wheat and rice markets cause relatively large price movements.

Developed countries pursue a number of policies that tend to lower the average world price of wheat while increasing its variability (6). Japan and the European Community (EC) effectively insulate high domestic producer prices from lower world market prices. The Japanese authorize a single government agency to act as the exclusive purchaser of wheat imports for resale on domestic markets at prices considerably above world market levels. The EC imposes a variable levy on imports which is adjusted daily to equal the difference between the higher fixed minimum import price and the world wheat price. Both policies prevent domestic producers and consumers from responding to changes in world prices, and both result in high internal prices, which dampen demand and lower prices in the rest of the world. These policies shift the burden of adjustment to consumers and producers in countries with policies that do not insulate internal markets.

Internal farm and food prices in centrally planned economies are controlled (6). State trading agencies are given exclusive rights to purchase and sell wheat on the world market. The state trading agency in a country that makes large purchases (the Soviet Union, for example) is able to exercise considerable marketing power using its exclusive purchasing authority.

¹ Italicized numbers in parentheses refer to items in the References section at the end of this article.

Many centrally planned countries also favor bilateral trade agreements as a means of guaranteeing import supplies. This practice diminishes the amount of wheat available in export markets that can be used to adjust to unforeseen shifts in supplies; it thereby increases price instability on world markets.

Wheat pricing and marketing policies of developing countries vary widely among nations. Many developing nations compensate for increases in food prices by employing policies which fix low food prices (6). Egypt and Pakistan, for example, maintain low consumer prices for bread and wheat products. To hold down the cost of consumer subsidy programs, governments often set low producer prices accompanied by export taxes or occasional embargoes on wheat exports. Most developing nations also rely on state trading organizations. The trading agency for a large importing country may be able to exploit its purchasing power to gain more favorable prices. Consumers and producers in these nations are insulated from world market forces and are inhibited from making adjustments to world market conditions.

Rapid population growth in developing countries coupled with an expected slowdown in productivity gains points to a rising developing country share of world wheat imports in the eighties. Although U.S. wheat exports will continue to face high levels of protectionism and price instability, population growth and consumer-oriented food policies in many developing nations will mean a larger volume of world wheat trade and, consequently, higher average wheat prices for U.S. farmers. It may also mean more wheat purchases by state traders.

The world rice market is also characterized by a number of trade policies that insulate government-dictated internal prices from the world market. Among the developed countries, Japan's rice policy is the most significant. The Food Agency of the Japanese Government, the sole purchaser of rice on domestic and international markets, guarantees high internal producer prices and resells rice at slightly lower government-fixed prices (6). Surpluses have developed because these prices are well above world market levels. Consequently, the Japanese have begun subsidizing rice exports, thereby displacing the United States from many of its traditional rice markets. These subsidized exports have also tended to depress rice prices in other parts of the world.

Cheap consumer rice policies in many developing Asian countries, particularly in Thailand, Burma, and Indonesia, on the other hand, have raised prices in the world market. These countries maintain consumer rice prices well below world market levels (6). Their governments usually prevent producers from receiving world market prices by using their sole purchasing authority to set low procurement prices. Export taxes, recurrent embargoes, and a lack of fertilizer sup-

plies hold rice exports of Thailand and Burma well below potential levels. For Indonesia, the world's largest rice importer, low producer and consumer prices coupled with population increases will likely result in a growing domestic rice deficit. A more producer-oriented policy by any of these countries could greatly increase the availability of rice on world markets. Such a change is not likely, however, because higher consumer rice prices would be politically unacceptable, and the alternative—higher producer prices without higher consumer prices—would be too great a financial burden on the governments.

Coarse Grains

The most important coarse grains in world trade—corn, barley, and grain sorghum—are usually purchased as livestock feed and are more responsive to changes in prices and income than are food grains. The proportion of grains, protein meals, and other energy feedstuffs used in livestock feed rations is sensitive to relative price changes among these commodities. Also, the demand for livestock products, from which the demand for feed grains is derived, is more sensitive to price and income changes than is the demand for food grain products.

Developed countries support coarse grain prices using generally the same means as used for wheat (6). The EC uses variable levies to insulate high internal coarse grain prices from cheaper world market prices. Japanese policy toward coarse grain imports, however, differs substantially from wheat import policy. The Japanese have quota restrictions on barley, but corn and grain sorghum for livestock feed are allowed to enter duty free for Japan's growing livestock industry. However, if the Japanese continue to subsidize the use of surplus rice for feed, some of these imports may be displaced (6).

Centrally planned economies have been a growing market for coarse grain imports in the past decade as a result of a decision by the Soviet Union and most Eastern European countries to increase the animal protein intake in consumer diets. Coarse grain imports have been necessary to provide much of the feed for the expansion of livestock herds in centrally planned nations.

Thailand and Argentina are the major developing country exporters of coarse grains. Thailand imposed export restrictions on corn in 1979/80, while Argentina supports the prices of corn and grain sorghum at or near world market levels.

The import policies of middle-income developing countries like South Korea and Mexico will become increasingly important as these countries build their livestock industries. These countries will likely adopt liberal import policies on feedstuffs in order not to jeopardize their development plans.

Consequently, since the share of U.S. coarse grain exports going to middle-income countries will likely grow, the overall level of protection facing U.S. coarse grain exports in the eighties will likely decline.

Soybeans

The size of the total world soybean market increased fourfold in the last 20 years. The absence of major import restrictions on soybeans and soybean meal, along with high levies on competing feedstuffs and rising consumer demand for livestock products, caused a rapid growth in soybean purchases.

The nine EC members and Japan, the world's major soybean importers, accounted for 59 and 18 percent, respectively, of world soybean imports in 1978. Japan and the EC currently have few significant restrictions on imports of soybeans and products. More restrictive trade policies by these importers would have a large impact on the world soybean market. Japan is not likely to impose restrictions since, in the most recent round of Multilateral Trade Negotiations, it agreed to bind the import duty on soybeans at zero. In the EC, however, sentiment is growing among some farm groups to place tariffs or quotas on soybeans and soybean meal to reduce chronic dairy product surpluses, curtail the displacement of domestically produced grains in feed rations, and reduce the EC's high degree of dependence on imported protein feeds. In addition, the future admittance to the EC of Spain, Portugal, and Greece—all surplus olive oil producers—has led to a proposal that all edible vegetable oils be taxed, with the tax on olive oil rebated.

Alternative U.S. Export Marketing Strategies

As the United States becomes more integrated into world agricultural trade, support of free trade in the agricultural sector has begun to erode for a number of reasons, one of which is the limited success of trade liberalization in agricultural markets (5, 10). Despite several rounds of multilateral negotiations on tariff reductions, the gains to U.S. agriculture have been perceived as minimal by many interest groups. One difficulty of using trade policy negotiation to promote trade liberalization is that it implicitly involves negotiation of domestic policies (8). Many nations regard negotiation of domestic agricultural policy as politically impossible. Food is often considered too critical to the nation's welfare to be vulnerable to the influence of international markets and, consequently, domestic food production must be protected. There may also be severe structural problems in a country's agriculture that make the cost of adjustments to a more liberal trade policy too severe. Further, agricultural interests may be too politically powerful for politicians to risk alienation. The lack of progress in past

efforts at agricultural trade liberalization is cited by some to argue that future efforts will fail and that free trade in agricultural products is an unrealizable ideal.

A second cause for the erosion of U.S. support for free agricultural trade is the cost of price instability to the United States. Because other nations do not allow their economies to adjust to changing world market conditions, the United States is forced to become the adjuster for world markets. It is argued that the resulting instability in U.S. prices is injurious to both farmers and consumers, and measures need to be taken to moderate these price fluctuations (1).

A third cause is the belief that the U.S. comparative advantage in agriculture is exploited by state traders who use their buying power at the expense of the U.S. farmer (10). By imposing an optimum import tariff, a large importing country can often improve its terms of trade (3). If the terms of trade for the food importer improve through the use of buying power, then the relative price of food on the world market is lowered. Therefore, some agricultural interest groups have argued that U.S. farmers face prices that are lowered by state traders, and the United States should employ its monopoly power in food to redress this exploitation (10).

Finally, the cost of the export boom on the agricultural sector and economy in general became apparent during the late seventies. The surge in export demand increased pressure on the U.S. resource base—both renewable and nonrenewable—and on the U.S. transportation system. Food price inflation was partly a result of the export boom of the seventies.

The global shift away from excess supply toward a tighter supply-demand balance in the eighties could lead to a reevaluation of U.S. trade policy. Such a reevaluation may include the following questions:

- Should the Nation continue to press for trade liberalization when past efforts have met with limited successes, while continuing to bear the costs resulting from foreign protectionist policies?
- Should the United States expand use of its limited natural resources in an effort to meet this growing export demand?
- What are the tradeoffs between higher export earnings and domestic food costs?

Alternative strategies that may be considered are: (1) greater emphasis on bilateral trade agreements, (2) greater use of export embargoes, and (3) policies designed to weaken the link between world and U.S. prices, namely, various types of marketing boards.

Bilateral Trade Agreements

The prospect for tighter world grain supplies in the eighties, along with the failure to achieve a significant reduction in agricultural trade barriers through multilateral negotiations, has led to a growing interest in bilateral trade agreements. Proponents maintain that bilateral agreements stabilize foreign demand for U.S. agricultural products and allow for long-range supply management. Importers benefit because they are assured a specified supply of U.S. agricultural products, often at favorable credit terms. Yet greater use of bilateral agreements alone is not likely to stabilize foreign import demand for U.S. grains and oilseeds. Although a large proportion of U.S. exports could be tied up in bilateral contractual commitments, the remaining residual market, though small, would have to absorb much of the foreign demand arising from unanticipated supply shortfalls. The gains in supply stability that might result from greater use of bilateral agreements would be largely offset by the increased volatility of prices on the residual market. Because most bilateral agreements specify only the quantity to be traded and leave the price to be determined at the time of shipment, the residual market will determine price for the entire market.

In addition, if world prices change substantially between the time when the agreement was made and the time the commodity is shipped, the quantity imported (exported) may exceed the amount that consumers (producers) are willing to purchase (sell) at the prevailing world price. The means of enforcement are limited and bilateral trade contracts can break down readily when either of the two parties to an agreement perceives that the terms of the agreement are turning against them.

Bilateral trade agreements do not, in general, stabilize prices because prices are usually not specified. The agreements, furthermore, are of only limited value in stabilizing the quantity traded since the agreements frequently break down when one side becomes dissatisfied with the terms. In special cases in which widely fluctuating demand of a major importer is disrupting the market—as in the case of Soviet grain imports—a bilateral agreement can prove to be a stabilizing factor. In most cases, however, the primary value of bilateral agreements to the United States is as a means of conveying special credit or marketing guarantees to favored importing countries—guarantees that private traders will not provide. Even this limited use runs the risk of snubbing traditional commercial customers who have not been granted special terms.

Export Embargoes

The export prospects for the eighties project both a growing volume of trade and increasing variability in that trade. Thus,

future market disruptions will likely be more serious than those of the seventies. During the seventies, three export embargoes were imposed by the United States in times of severe short supplies. The objectives of these export embargoes were to halt inflationary price increases to consumers which can be damaging to the U.S. longrun productive capacity. The embargoes were successful in dampening U.S. farm price increases. With increasingly tight world supplies and production expanding into more marginal U.S. land in the eighties, there could be increased pressure to use trade embargoes to limit agricultural exports. As in the past, farmers would bear the shortrun costs of the decline in prices, and the long-run costs of the perception by importers that the United States is no longer a reliable supplier of food. In years without export embargoes, U.S. agricultural trade would continue much as it has in the past.

Marketing Boards

A more fundamental change to redesign U.S. trade policies to meet the changed global supply and demand situation and weaken the link between U.S. and world prices would be creation of a U.S. marketing board to maximize the return on U.S. participation in the world market, or at least to ensure that foreign consumers bear a full share of the costs of producing for an expanding but unstable export market.

Several types of boards could be established, but in general they can be divided into two categories: first, boards that control both domestic and export marketing, such as in Canada and Australia, and second, boards whose authority is confined to export markets alone.

A marketing board with both domestic and export authority could act as a price-discriminating monopolist. It could charge different prices in each market, and hence, the price link to world markets would be weakened. In principle, such a board could allocate supplies among markets, raising the prices received by farmers and paid by consumers in both domestic and foreign markets. Producers would, by law, have to join since the ability of the board to be successful depends upon the degree of marketings controlled. If the board were successful and producer returns rose, then it would likely have to impose mandatory output quotas on producers to avoid large stock increases.

The second type of marketing board is one with only export authority. This type of board was proposed in Congress in 1979 (12). A comparison of a U.S. Government export marketing board for wheat with a purely competitive market suggests that producer welfare would be lower and price in-

stability greater (2). Under assumptions of the study, the Government marketing board would raise the export price by 10 percent by reducing U.S. wheat exports by 22 percent. However, reduced exports would lower domestic prices received by U.S. farmers by 34 percent and reduce U.S. wheat production, causing a loss in producer income. Although the board would capture additional income from foreign countries—\$1.5 billion over 5 years—producers would still experience an income loss of \$4.6 billion because of lower domestic prices even if the additional income is given to them. The variation in the U.S. wheat price would also rise slightly with a marketing board.

The formation of a U.S. marketing board could provoke retaliatory trade policies by importing nations with sufficient marketing power (11). The widespread use of such policies could further reduce world trade by initiating a trade war such as occurred after the passage of the Smoot-Hawley Tariff in 1930. Even if retaliatory trade policies were avoided by negotiation among countries, it is not certain that the outcome of such negotiations would yield greater benefits than if the marketing board had not been implemented.

Multilateral Initiatives

Because domestic policy initiatives often do not resolve trade issues, such issues have long been subject to international discussion and negotiation. Prospects for the eighties suggest U.S. interest in trade liberalization and price variability will be greater than ever before. The negotiations for a new International Wheat Agreement illustrate the issues of dealing with price instability and food security through commodity agreements. The Multilateral Trade Negotiations illustrate the difficulties of attempting to liberalize world trade in all products.

International Wheat Agreement²

Since 1933, a series of International Wheat Agreements has been negotiated. The central rationale of these agreements has been the need for price stability and orderly marketing in the world wheat market. A secondary concern of recent agreements has been that of the provision of food aid to developing countries. The most recent round of negotiations was suspended in spring 1979, necessitating the extension of the consultative and food aid conventions of the 1971 International Wheat Agreement until July 1981. The major areas of disagreement were:

- The width and level of price bands.
- The size and distribution of buffer stocks.
- The burden of holding and financing buffer stocks.
- Special provisions to take account of problems facing the developing countries.

Despite the interests of most nations in an orderly world market with stable prices, International Wheat Agreements since 1933 have been difficult to negotiate, and several quickly collapsed; the 1933 agreement was never effectively implemented. These difficulties reflect the conflict between the goals of importers and exporters as well as competition among countries within each group. In the most recent round of negotiation, the exporters proposed a trigger price band of \$140 to \$215 per ton. The importers were generally willing to accept \$140 per ton as a minimum price, but some would accept a maximum price of only \$160 per ton. The interest in an agreement ebbs and flows with changing market conditions. In periods of tight supplies, exporter enthusiasm for an agreement is limited, while during years of abundant supplies, importer interest is limited. The longest successful agreement was the International Wheat Agreement of 1962, which lasted until 1967, when the United States and Canada began to export burdensome stocks. The success of the 1962 agreement was in large part due to the stability of the market during those years.

Therefore, the interest in a new international wheat agreement in the eighties will depend on the market situation. Current projections of the wheat market in the eighties indicate:

- That an increasing share of world wheat trade will be imported by developing countries.
- That the volume of world wheat trade will increase as consumption increases in importing countries exceed production gains.
- That real prices for wheat will rise and be more variable.

Therefore, the pressure to negotiate a new international wheat agreement to encourage price stability and meet the food security needs of developing nations will likely be from developing country importers rather than from developed exporters.

Multilateral Trade Negotiations (MTN)

One hypothesis of international trade theory is that free trade increases the income of the exporting country, provides the importing country with less costly supplies, and mini-

² Background material for this and some of the following sections compiled by Anne M. del Castillo, formerly in the Trade Policy Branch, Econ. Stat. Coop. Serv., U.S. Dept. Agr.

mizes world price instability (3). Supporters of free trade have embraced these concepts, and have reasoned that any reduction in protectionism would improve the exporter's income and importer's welfare. Recognition of the difficulties associated with bilateral efforts to liberalize trade has elevated trade policy negotiations into an international forum. Since 1960, there have been several rounds of multilateral trade negotiations under the auspices of the General Agreement on Tariffs and Trade (GATT). In all these rounds, negotiations of agricultural trade policies have been more limited than those for industrial commodities. One reason is the linkage between domestic agricultural support programs and agricultural trade policies (8). A second reason is the nature of agricultural trade protection: multilateral trade negotiations have typically dealt with tariff reductions, yet agricultural trade barriers are generally nontariff barriers, like quotas, variable levies, and health and sanitary regulations (5). These restrictions are often more subtle than tariffs and their impacts are more difficult to identify. At what point, for instance, can one say that a sanitary regulation on imports ceases to be necessary for protecting the health of consumers and domestic livestock herds and becomes instead a trade restriction? Similarly, one can question if packaging regulations on imports are necessary to improve product quality and safety or whether such regulations act primarily as trade barriers.

In 1979, the latest round of Multilateral Trade Negotiations—the Tokyo Round—was completed, signed by President Carter, and ratified by the Congress. The U.S. goal in the negotiations was to reduce trade barriers facing U.S. exports. About \$16.5 billion of U.S. agricultural exports were the subject of negotiations. The United States received concessions in the form of reductions in duties, nontariff barriers, and duty-bindings (maximum fixed import duties) applied to \$3.8 billion worth of its agricultural exports. Consequently, 23 percent of the eligible U.S. agricultural exports in the 1976 base period were covered by concessions obtained from foreign countries. When fully implemented, concessions on nontariff barriers and duty reductions are expected to increase U.S. agricultural exports by at least \$500 million. Commodity sectors reaping benefits from these negotiations were livestock, livestock products, tobacco, fruits, vegetables, oilseed products, feed grains, and rice. The United States received duty-binding concessions on more than \$1.3 billion (1976 dollars) worth of agricultural commodities. Taiwan agreed to duty-bindings on soybeans, corn, and cotton. Japan agreed to duty-free imports of soybeans and to mixed duty-bindings on citrus imports.

The United States granted concessions covering \$2.4 billion worth of agricultural imports. When concessions on nontariff barriers and duties are fully implemented, U.S. agricultural imports are estimated to increase by about \$155 million. The U.S. concessions covered cheese, livestock, livestock products, fruits, vegetables, crops, and crop products. The

United States agreed to bind its duty on palm oil imports, which were valued at \$128 million in 1976. Although the duty had been bound internationally at 3 cents per pound, the United States agreed to gradually reduce that duty to a maximum of one-half cent per pound.

Trade in agricultural commodities will also be affected by a number of other Tokyo Round agreements. One such agreement provides new rules on the use of countervailing duties. Export subsidies on agricultural products are permitted, provided that subsidies do not displace other nations' exports or involve "material injury" in a particular market. After determining injury to a domestic industry, an importing country may impose a countervailing duty on the subsidized export of an amount no greater than the subsidy. The agreement also established criteria for the determination of injury. The requirement for "material injury" before the use of countervailing duties may inhibit any U.S. retaliation against export subsidies in the noncheese dairy market. Since "material injury" may be difficult to prove, this clause may not inhibit the use of export subsidies by competitors believing the probability of retaliation low.

The new trade agreement also contains provisions for commodity arrangements for dairy products and cattle. The international dairy arrangement established an International Dairy Products Council that meets at least twice a year to evaluate the world situation and outlook for dairy products and to review the functioning of the arrangement. The council will establish committees that meet at least quarterly to review provisions for maintaining minimum export prices for cheese, butter, and nonfat dry milk. The arrangement also provides for consultations and an exchange of information to identify remedies for serious market imbalances in dairy products. A bovine meat arrangement created an International Meat Council which meets at least twice a year. Its principal objective is to expand and stabilize the world meat and livestock market by reviewing trade barriers and improving communication and cooperation among the participants. In the event or threat of serious imbalances in the world supply and demand situation, the Council recommends possible solutions to importers and exporters in the general context of principles and rules of GATT.

Thus, the latest multilateral trade negotiations have made limited gains in dealing with nontariff barriers, the dominant type of trade restrictions in agriculture. If future multilateral trade negotiations are to make progress in liberalizing world agricultural trade, negotiation of nontariff barriers will be essential.

International Food Aid Issues

The increased importance of the United States as a food exporter in the eighties implies a greater U.S. role in meeting

the food aid and food security needs of developing countries. Since the world food production shortfalls of 1972 and 1974, food aid and food security have become prominent issues in the dialogue between developed and developing countries. The United States will have an interest not only in meeting developing countries' food needs, but also in taking an active role in shaping policies designed to promote a more equitable sharing of food aid responsibilities, and policies that assist developing countries in meeting longer term food needs themselves. In this section, we outline some food aid proposals being discussed and the U.S. response. We analyze several possible policies: a U.S. food security reserve, a food security fund, the Five Point Plan of the Food and Agriculture Organization of the United Nations (FAO), and the Food Aid Convention of 1980 (FAC). Finally, we examine some future issues concerning programming of P.L. 480 assistance.

Goals of developing countries have included increasing the quantity of food aid available and divorcing food aid from variations in donor country supplies. To implement these objectives, developing countries have supported specific recommendations:

- Achieve the World Food Conference goal of guaranteeing availability of 10 million tons of grain for food aid.
- Agree on minimum food aid targets for nongrain commodities.
- Negotiate a new Food Aid Convention (accomplished with the 1980 Food Aid Convention).
- Promulgate food aid guidelines by the FAO Committee on Food Aid Policies and Programs.
- Increase the proportion of food aid given through the UN/FAO World Food Program.

To meet its food aid role, the United States:

- Pledged 4.47 million tons of food aid—more than double the previous commitment.
- Pledged \$220 million toward the 1979/80 World Food Program budget.

Food Security Reserve

The Administration, in July 1979, proposed to a joint hearing of the House Committee on Agriculture and the Committee on Foreign Affairs that the United States establish a 4-million metric ton Food Security Reserve to buttress U.S. overseas assistance programs and to provide a supply to meet food emergencies. Once the P.L. 480 budget for a particular year has been appropriated, it is difficult to increase

the funding of programs to compensate for higher-than-forecast prices. Thus, as prices rise, the quantity of food aid programmed under P.L. 480 falls because of the rigid budgeting process. The establishment of the Food Security Reserve (FSR), with appropriate authorization for release and programming, has been advocated as a means of allowing the United States to meet its food aid commitments in periods of tight supplies, rising prices, and rigid budgeting.

Stocks of wheat for the reserve were acquired by the Commodity Credit Corporation following the suspension of grain sales to the Soviet Union by President Carter on January 4, 1980. Wheat could be released from the FSR to the P.L. 480 program only to meet urgent humanitarian needs, and only when regular P.L. 480 supplies were inadequate because U.S. domestic wheat supplies were very tight. A small portion, up to 300,000 tons, could be released for urgent humanitarian relief in any fiscal year only when the United States could not respond quickly to a localized emergency through a reallocation of P.L. 480 resources or supplemental appropriations.

The establishment of a 4-million ton FSR as part of a 10-million ton world reserve would raise the level of U.S. wheat prices by about \$6 per metric ton, thus increasing costs to millers (4). Because wheat flour costs constitute such a small proportion of total bread costs, bread prices paid by consumers would increase only slightly as a result of creating the reserve. The establishment of the FSR would affect the operation of the U.S. farmer-owned reserve. The volume of wheat in the farmer-owned reserve would be 14 percent less, and the probability of no stocks in the farmer-owned reserve would increase. Because the Food Security Reserve is assumed not to be responsive to price triggers and because its formation would reduce the quantity of grain in the price-sensitive farmer-owned reserve, U.S. wheat prices would be less stable, the coefficient of variation rising from 25 to 38 percent. Higher prices resulting from increased demand would reduce the costs of U.S. domestic price support programs by \$51 million. However, if management and storage costs for the FSR were included, the scheme would raise U.S. Government outlays by \$114 million.

Food Security Fund

A second method proposed for helping food recipients meet their food security needs is for donor nations to establish a food security fund that would finance additional commercial imports in the event of a crop shortfall. Such a fund would tend to stabilize world wheat prices, and increased commercial demand would raise world prices by about \$6 per ton (4). The United States would supply the bulk of the additional import demand. One difficulty with this proposal is that the fund buys less wheat as prices rise.

Public Law 480 (P.L. 480)

Establishing a food security reserve or fund would assist the United States in meeting the food aid needs of developing countries during periods of short supplies, even though P.L. 480 programs would continue to be the major U.S. food aid programs. Given the changing food balance, these programs need to be reviewed. Legislative changes to P.L. 480 were introduced in 1979 which stressed development in developing countries (9). If the requirement that food aid not act as a disincentive to food production by depressing prices in recipient countries is taken seriously, the present level of food assistance might be reduced. Requirements that food aid and the proceeds from its sales be used to benefit only poor nations could make countries ineligible for assistance, or could lengthen the certification time for a country's eligibility. The 1979 legislation does not address the issue of increased food-reserve stocks in recipient countries.

In addition to the FSR, other potential changes in food aid legislation may be introduced (9). One change is a modification to give a higher priority to food aid shipments. Many members of Congress believe that the use of food aid to promote development in recipient countries through greater resources for investment—along with its use for urgent humanitarian purposes—should be given priority relative to commercial exports, rather than being treated as a residual demand after meeting commercial requirements. To further enhance the development aspects of food aid, requirements for allowing countries to receive Title I (concessional sales) and II (full grant aid) may be stiffened to ensure a greater share to poorer nations. There also may be legislation introduced to increase the minimum tonnages under Title II.

FAO Five Point Plan

After suspension of the negotiations for an international wheat trade convention in February 1979, the Director-General of FAO proposed a Five Point Plan of Action on World Food Security. This plan was intended to provide an international framework for meeting the food aid and food security needs of developing nations in the absence of a new Food Aid Convention in the International Wheat Agreement. The basic elements of the plan were adoption of:

- Food grain stocks policies.
- Common criteria for the release of reserve stocks.
- Special measures to assist low-income food-deficit countries to meet current and emergency import requirements.
- Aid to help developing countries realize their stocking and other food security aims.

- Measures to increase the collective self-reliance of developing countries.

Some of the points of the plan are being undertaken unilaterally. For example, the plan urges the adoption of national stock policies during periods of ample supplies. The United States has undertaken stockpiling efforts through the farmer-owned reserves and has proposed a separate FSR.

Other points in the plan, however, involve some loss of national sovereignty to international organizations and have not been well received. The plan recommended that participating stockholding members abide by a system of international price triggers to release stocks. The stocks would be used to ensure price stability in the world market. But such world benefits from a release of stocks through an international system of price triggers may not coincide with the domestic benefits from a release of national stocks. In addition, the plan provided for the Director-General to alert governments to release stocks in the event of an extreme production shortfall. This raises an issue that could become an increasing source of conflict between national governments and international organizations in the eighties as market power shifts to exporters when supply tightens—the role of international organizations in advising national policy actions.

The third point recommended special measures to assist low-income, food-deficit countries, including raising the food aid target of 10 million tons annually set by the 1974 World Food Conference. FAO's plan also invited the International Monetary Fund to study the implications of expanding its financing facilities to provide financial support to developing countries that experience balance-of-payment problems because of food production shortfalls or high food import costs. It suggests that developed countries contribute toward meeting a minimum annual target of 500,000 tons of grain for the International Food Emergency Reserve, and that pledges to the reserve be made for more than 1 year. Donor countries should establish food reserves designed to ensure the continuity of their foreign food aid programs. Further, donor countries should consider purchasing commodities for their overseas food aid programs from food exporting developing countries, rather than from developed nations. The plan also recommended increasing technical and financial assistance to help developing nations pursue their national food security programs and supported the establishment of regional stockpiling arrangements among developing countries.

The Five Point Plan is an encompassing approach to food security. The initiative for the plan comes from those who favor attempts to divorce food security from national policies by international coordination of national food security stocks, release criteria, and guarantees of financial and technical assistance. Although a new Food Aid Convention has been signed, many of the proposals and goals of the Five Point

Plan continue to be pursued. The philosophical conflict between international organizations and the sovereignty of national agricultural decisionmaking underlying this proposal may become more intense in the coming decade.

The Food Aid Convention of 1980 (FAC)

The Secretary of Agriculture signed on behalf of the United States the Food Aid Convention of 1980 (FAC)—a component of the International Wheat Agreement—on April 29, 1980 (13). The 1971 FAC pledged donor nations to a total of 4.2 million tons of food aid annually. The FAC of 1980 increased the minimum total contributions to 7.6 million tons, and encouraged donors to meet the 10-million-ton goal established at the 1974 World Food Conference. The United States pledged a minimum of 4.47 million tons, up from its 1.89-million-ton 1971 commitment. Contributions may be in the form of gifts (either grains or cash), or sales for the currency of recipient countries, or long-term credit sales at below-market interest rates.

While less comprehensive than the Five Point Plan, the FAC of 1980 does meet some of the FAO proposals. The forms of contributions fit into the U.S. food aid programs, such as P.L. 480, and the sovereignty of national policy actions is not questioned. From the perspective of the food aid recipient countries, the FAC may be less able to meet their needs than the Five Point Plan, yet a greater quantity of food aid is divorced from variations in donor country supplies. During the eighties there may be mounting pressure for future grain agreements to incorporate food security features like those of the Five Point Plan.

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Global Prospects

Changes in the Farm Sector

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Commodity Programs

Commodity Programs and Policies

Milton H. Ericksen, Kenneth C. Clayton, James Johnson, and Keith J. Collins*

World supply and demand will greatly influence the shape of U.S. commodity policy during the eighties. It will be essential that policy and programs for agriculture relate to world market conditions and, at the same time, recognize the vulnerability of farmers to economic disaster as a result of market conditions or natural disasters. The need for adequate farm income will have to be balanced against the protection of consumers from rapid rises in food prices.

Many Government policies, programs, and regulatory actions will affect the farm economy during the eighties. These will include income and estate tax policies, credit policy, pesticide and environmental regulations, export and import trade agreements, public grant and loan programs, and agricultural commodity policies and programs. How these programs and regulations should be applied and the effect that they may have—singly and in combination—are matters that will receive considerable attention.

This paper focuses on commodity program and policy issues likely to arise in the eighties. The response of policymakers to these issues will be rooted in their objectives for agriculture and food. Included among their primary objectives will likely be the prevention of disastrously low farm income and unacceptably high food prices.

Development of a commodity policy perspective for the eighties requires that the objectives for our food and agriculture system be viewed in conjunction with current and impending issues and problems. In addition to reviewing several of the more important issues likely to face agriculture during the eighties, policy issues relating to the various Government commodity programs are addressed in this paper. The major Government programs that have been developed for individual commodities, as defined by their predominant provisions, include the following:

- Price support in conjunction with supply control.
- Price support with no supply control.
- Voluntary price and income support programs.
- Unsupported commodities.

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Each of these program types is presently in use for one or more farm commodities. This paper will identify how current programs are applied to particular agricultural commodities, and more importantly, how suitable these programs will be in meeting the needs and solving the problems that are likely to emerge in the coming decade.

Market Characteristics and Policy Objectives

In the aggregate, agricultural supply and demand exhibits only a small response to price changes within a marketing year. However, these aggregate market characteristics, coupled with the random and uncontrollable shocks inflicted by nature and by policy decisions of leaders in other countries, can cause large and unexpected price movements—changes that are beyond the control of individual producers. Policymakers also must consider changes in the technical aspects of production and in the structure of the marketing and processing sectors.

These characteristics of farm commodity markets provide economic arguments supporting public intervention, and they have furnished the substantive basis for Government policy initiatives since the twenties. As perceived then, low and unstable farm prices and incomes were rooted in the nature of market demand and supply. Today the setting is somewhat different, but these demand and supply characteristics continue to support the view that farm product markets are unique in our economy.

Problems and Issues in the 1980's

The problems and issues faced by policymakers will be affected by the supply and demand setting and by the price and availability of input factors used in agricultural production. Commodity policies and programs must also be compatible with the structure of the production and marketing system. These factors are looked at in the context of the eighties in this section.

The Supply-Demand Setting for the 1980's

The relatively low rates of U.S. population and income growth projected through the eighties will likely give rise to

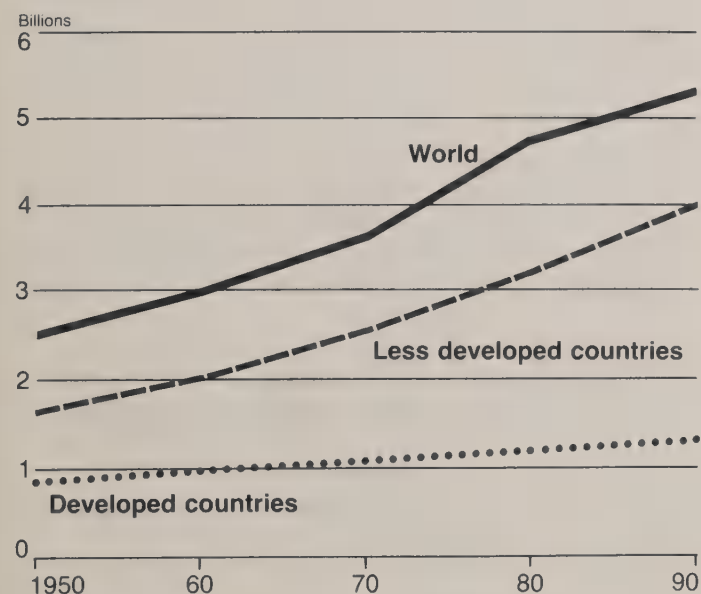
continued limited growth in domestic markets. Our agricultural producers will have to look abroad for additional market expansion. Rapid income and population growth (fig. 1) and increased red meat consumption in many developing countries, together with the comparative advantage the United States enjoys in agricultural production, will continue to contribute to a rising export share potential for many farm commodities (figs. 2 and 3).

Real price increases for grains and oilseeds seem likely over the eighties. Such increases indicate that commodity sectors are likely to be operating at full production levels. This makes it even more important to realize that the nature of agricultural production and the demand for agricultural products are such that production and utilization are not likely to balance in every production period. Although there will be some years when stocks build, our future focus will be on meeting a growing demand, fueled in large measure by exports.

The growing interdependence of domestic and foreign markets makes the process of defining and attaining policy for U.S. agriculture more difficult. Price support policies become related to the competitiveness of American commodities in foreign markets. If the United States is to rely on foreign markets, then production restriction and reserve policies must be implemented in such a way that this country is viewed as

Figure 1

World population 1950-90



Source: United Nations.

Figure 2

Value and quantity indexes of U.S. agricultural exports

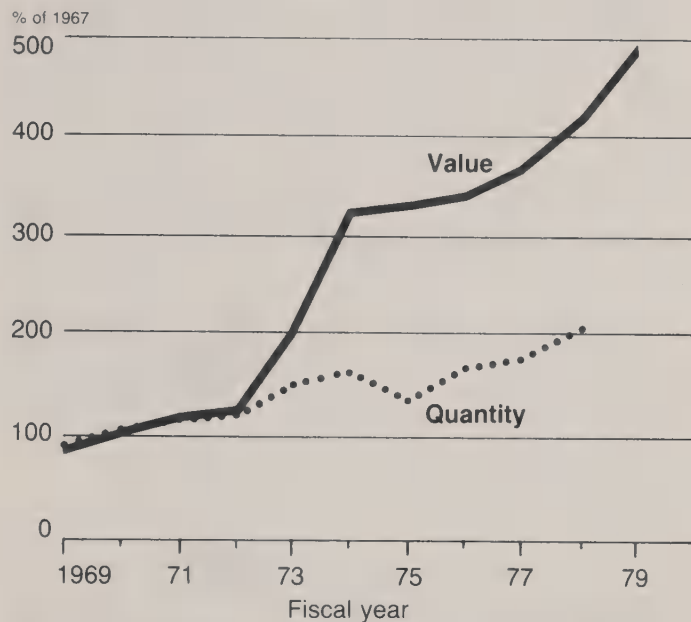
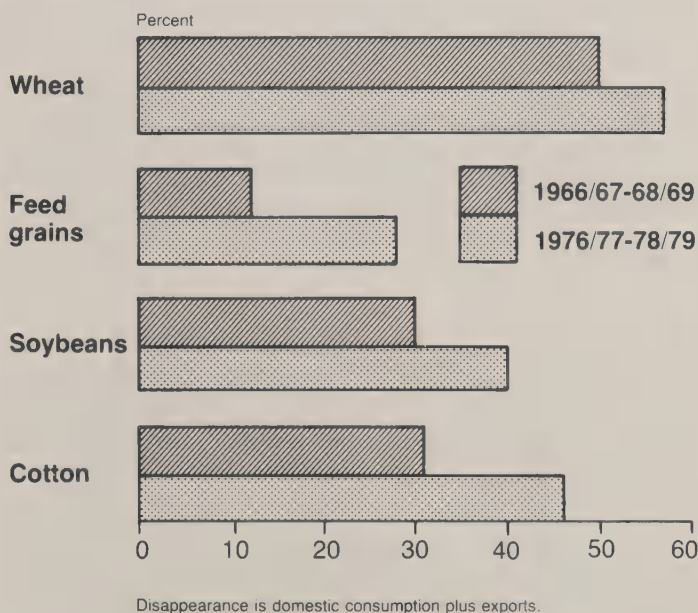


Figure 3

Average export share of disappearance for U.S. crops



Disappearance is domestic consumption plus exports.

a reliable source of supply. Export financing and humanitarian food aid programs must also be considered as part of an overall policy for agriculture.

The agricultural policies of foreign countries will have an increasingly important effect on U.S. policy. During the seventies, many foreign countries attempted to insulate their commodity prices from the large changes occurring in U.S. and world prices. Consumers and producers in those countries saw only an administered set of prices that were held fairly constant. This tended to dampen demand and supply adjustments within these countries that might otherwise have helped moderate U.S. price changes. As a result, the U.S. market had to absorb larger price changes than would have otherwise prevailed.

The combined characteristics of commodity demand, production response, and reliance on export markets provide the basis for extremely volatile commodity markets during the eighties. This will add even greater emphasis to the goal of protecting consumers from unduly excessive prices and protecting farmers from disastrously low incomes.

The possibility of even greater price instability raises the problems of risk and uncertainty to new levels. Unstable grain prices affect livestock markets by disrupting plans, exacerbating cycles, and undermining livestock productive capacity. The variable farm incomes associated with changing prices, besides causing hardship in low income years, can also affect efficient farm resource use. Instability places a premium on diversification at the expense of any gains that might otherwise be realized through specialization. Further, risk and uncertainty can affect both the availability and terms of credit.

Aggregate Production Capability

A current view holds that U.S. agriculture is rapidly approaching, or has in fact attained, relative resource equilibrium. As such, it no longer has an unused reserve of resources that can be tapped for immediate production response. Resources will be drawn into agricultural production only if the economic returns from doing so are greater than the returns available through alternative uses.

Producers of land-based crops can either increase yields or bring more land into production. Yields can be increased by improved management of existing production resources or improved genetic potential of seed stock. Increasing the genetic yield potential relates to expenditures on basic research by both the public and private sectors. Such funds must compete with other Government spending and other private investment opportunities. Increasing yields through heavier applications of fertilizer and other chemicals will increase production costs, particularly since these inputs are largely based on petroleum and natural gas. Increased chemi-

cal use may also carry a hidden cost in the form of increased pollution and other environmental damage.

Bringing more land into crop production under current conditions means either switching land from livestock support to crops or bringing land into production that is currently not used for crops or livestock. With most of our prior set-aside and diversion acreage already returned to production, the prospect of further additions to the cropland base will be realized only at progressively higher production costs plus substantial investment in such measures as terracing, irrigation, or drainage facilities. Even then, the available acreage is not large, and it is likely to be supporting livestock. Beyond the possibility of more intensive input use, policymakers appear limited in being able to effect shortrun production increases. Production capacity, how it may be augmented, and at what cost is considered in greater detail by Fox and Clayton elsewhere in this issue.

Conservation and Use of Natural Resources

The Federal Government has provided assistance for conservation efforts by farmers for many years. Past assistance has been largely a response to environmental stress or excessive production. The excess supply conditions confronting the farm sector in the thirties, fifties, and sixties left room for conservation actions. Farmers were urged to convert lower productivity cropland subject to erosion, drought, or other environmental problems to pasture or forest land.

During the seventies a new set of interests emerged, including the impact of fertilizers, pesticides, and other chemicals on water quality, the effects of mechanized agriculture on soil quality and loss, and the impact of restricting agricultural access to certain resources, particularly water. Recent administrative and legislative actions have emphasized a more careful accounting of the Nation's land and water resources, the protection of prime farmland, and the expansion of wilderness areas. Current indications are that in the eighties, the debate over resource use and conservation will be staged against a much tighter supply and demand balance. Any policy or program to redirect or restrict the use of cropland, water, fertilizers, pesticides, and other chemicals, and any special requirement for tillage and other mechanized production practices will require policy choices that could reduce farm output, reduce food supplies, and increase food costs. Justification for these programs and regulations will rest on whether they provide future benefits that more than offset their current or shortrun costs. Also involved will be the issue of property rights and the amount of control society, through Government, should exercise over the use and disposition of our resource base.

An important consideration for the issue of conservation and the use of natural resources is whether or not price and income support should be linked to conservation practices.

Some observers say that the conservation problem is severe enough to require specific conservation practices in order to be eligible for program benefits. This link would add another dimension to commodity program development.

Risk and Uncertainty

Most debate on agricultural policy over the past 50 years has focused on problems caused by excess production capacity. The eighties are more likely to be characterized by a farm sector that is in relative resource equilibrium. In addition, farms are relying more and more on purchased inputs in the production process. For the 7 percent of farms with annual sales in excess of \$100,000, production expenses absorb nearly 87 percent of gross income. Small adjustments in costs and/or prices for these farms could result in large adjustments in net income. The possible effects of this potential instability are several:

- Disruption of farm planning and investment decisions.
- Disruption in the domestic livestock sector with adverse effects on meat supplies and consumer food prices.
- Political debate on domestic consumption versus agricultural exports, raising questions of the strategy that the United States should follow in its foreign trade of agricultural products.
- Uncertainty concerning shifts in land use.
- Consideration of the use of cooperative or Government grain marketing.
- Increased use of trade conventions to obtain the highest possible price for exported products.

Increasing dependence on export markets in conjunction with a tighter projected global supply-demand situation could make U.S. producers even more vulnerable to price and income changes. Any one or a combination of the following events could result in substantial farm price and income changes:

- Unexpected domestic production levels due to exceedingly good or bad weather patterns.
- Changes in world economic conditions and the value of the dollar which influence trade.
- Changes in domestic political and economic conditions.
- Changes in the political views or situations in major trading and consuming nations, ranging from ideological to armed conflicts.

Volatile markets and a strained production capacity will increase the production and price risk faced by farmers and increase pressure on the Government to provide assistance to farmers. Society has supported the notion of sharing both production and price risks with farmers through grain reserves, target prices, loans, and disaster programs. In return, consumers have experienced a declining food budget as a proportion of their total income.

Energy Availability and Cost

It has been asserted that long-term decisions on energy use in agriculture should be based on the premise that fossil fuels will continue to diminish in supply and must be replaced with renewable energy sources. Farmers are sure to be faced with rising costs for energy-based production inputs—fuel, fertilizers, herbicides, and pesticides—as long as there are no significant breakthroughs in new energy sources. Fuel and other energy related inputs already constitute an increasing proportion of production costs, especially in irrigated regions.

Exactly what the energy situation portends for agricultural production in the eighties is not clear, but increasing energy costs will lead to changes in the economics of food production. Likely production trends include:

- Less use of fertilizers and other petroleum-based chemicals. This may make it difficult to maintain even current crop yields, much less increase yields.
- Loss of the economic advantage of using diesel fuel. Diesel fuel could experience rapid price rises just when producers have been making rapid shifts to diesel engines. If demand for diesel fuel continues to increase, the price could go above that of gasoline simply because a barrel of oil makes less diesel fuel than gasoline.
- Less use of irrigation to produce some field crops. As a result we may see a realignment of land values with land having favorable soil and climate conditions being bid up in price. This may also work against overall increases in production to meet a burgeoning domestic and world demand.

A second aspect of the energy question deals with onfarm fuel production. Gasohol has become a watchword for many farmers, farm groups, environmentalists, and consumers. A rapidly expanding interest in using field crops for gasohol could bring the use of cropland, water, and agricultural investment capital for alcohol production into conflict with the use of these inputs for food production. Several issues associated with the grain-for-fuel argument will have to be resolved in the policy arena. The first issue involves the location of fuel production facilities. If corn is used as an alcohol fuel stock, the corn residue can be used as livestock feed. Facilities

scaled to farm production would not disrupt location of livestock feeding, but large commercial alcohol plants could affect the existing structure of the livestock industry through their impact on feed availability and cost.

Another issue will involve the competition for grain between fuel and export uses. Conversion of grain and other agricultural products into gasohol under Government encouragement could well lock in an additional demand with substantial longrun impacts. Alcohol producers will want an assured feed stock at stable prices. If this objective is met, it could mean shifting even more of the anticipated price instability of the eighties to other uses. The changing cost picture could seriously affect regional comparative advantage leading to regional production shifts. These underlying shifts could pose problems for policymakers in developing and administering programs. In years of short supply, hard choices would have to be made between export commitments, domestic food and feed needs, and our energy program.

Marketing

As vertical integration and the use of contracts to gain increased control over quantity, quality, and prices become more prevalent, the use of traditional open markets can be expected to decline. The end result may be increasingly thin markets and the absence of reliable market price data. Absence of reliable price information particularly increases marketing difficulties for the smallest two-thirds of the Nation's farmers who neither produce the volume nor possess the managerial and technical skills to take full advantage of alternative marketing arrangements. Government policymaking is also impaired by the absence of reliable market information.

The economic environment depicted for the eighties suggests greater difficulty in maintaining stable prices. One of the goals of vertical integration is price and quantity stabilization. Policymakers will have to consider the effect of increased market integration on price stability for the segment that is not integrated. Also, the effects of increasing concentration on the freedom of individual farmer decisionmaking must be considered.

Production Costs

Estimates of the per-acre and per-unit costs of producing individual crops will continue to be an important factor associated with commodity policy in the eighties. With the expectation of continuing energy problems, rising costs, and the anticipated strain on production capacity, producers will most likely continue to focus policy debate on production costs.

Producers can effectively use production cost information in making claims for price and income supports. There is a

shared sense of fairness in being able to earn returns sufficient to cover production costs regardless of whether farm or non-farm businesses are being considered. However, every producer has a different cost level so the usual practice of estimating average costs for agricultural commodities has differential impacts. Those producers with above average costs can legitimately claim that their costs are higher and that prices equal to some average cost do not provide an adequate return. Lower cost producers will receive a windfall gain when average costs are utilized. At issue is whether less efficient areas should receive greater subsidization and the more efficient areas less public support.

A major problem policymakers have experienced in applying cost of production information is that cost-based target price adjustment formulas have not tracked actual changes in costs that producers have experienced. For example, producers faced substantial cost increases in 1979 and further increases in 1980, yet the calculated target price for corn in 1980 would have been below 1978 target levels and for wheat only slightly above 1978 levels. This situation contributed to the enactment of the Agricultural Adjustment Act of 1980 which gave the Secretary additional authority to adjust target prices to better reflect changes in the cost of production.

Ownership and Tenure

The average per-acre farmland value has continued to increase and currently averages 16 percent above 1979. When viewed in terms of an operating unit, the average capital requirement for a cash grain farm capable of attaining \$40,000 to \$60,000 in annual gross farm sales was nearly \$379,000 in 1976. Capital requirements for an identical farm totaled \$468,000 in 1978, rising by nearly one-fourth in the 2-year period. Rapidly increasing prices for land, machinery, and other equipment have raised the issue of how beginning farmers can gain entry into farming and how smaller farmers can expand operations. Policy concerns have focused particularly on the following:

- Whether the trend toward concentration and separation of ownership and management will continue.
- Whether corporate and foreign interests may gain ownership of an "unacceptable" amount of farmland.

A tenure situation in which the majority of land in farms is controlled by part-owners and tenants creates an income support dilemma for policymakers. The dilemma is how to effectively support the incomes of current farm operators without unduly adding to the wealth of current landowners. This policy problem could become more troublesome in the eighties as an increasing share of the Nation's farmers gain access to farmland through rental agreements.

Real Cost of Food

Although food expenditures by households have increased in absolute terms, they have not increased over the past three decades when viewed as a percentage of disposable income. Consumption expenditures for food averaged 21.7 percent of disposable personal income during the fifties, dropped to 18.5 percent during the sixties, and decreased again to 16.7 percent during the seventies. Increases in disposable income have more than offset increased food costs.

The trend of decreasing percentages of income spent for food could reverse in the eighties. This prospective change is based in part on the fact that processing and marketing costs amount to 60 percent of the total retail value of food. These costs will continue to rise as energy, labor, and other expenses increase. The farm value of the raw product is also expected to increase as the world balance of supply and demand tightens.

Policy Issues and the Current Commodity Programs

Three general commodity program concepts have evolved for field crops and dairy production. Each of these concepts is reviewed in terms of prospects for the eighties and as they relate to the broad policy objectives of supporting producer incomes and ensuring a reasonable supply for consumers.

Price Supports and Marketing Quotas

Since commodity programs began in the thirties, the concept of price supports and marketing quotas has been applied to almost all basic crop commodities and dairy production at one time or another. Currently, tobacco, peanuts, ELS cotton, and milk are the only commodities that still have the price support and quota type programs.

The general philosophy of these programs is to support income and provide stability. The level of price support has often been above the price the commodity could receive in the free market. The result is the need to control production since producers would otherwise produce more than demand warrants at the administered price. Quotas, either as allotment acreages or marketable quantities, are assigned to producers to keep quantities produced in line with what will be consumed at the support price. For crops, acreage allotments have been based on historical production patterns. This has, of course, limited the right to produce to those holding the allotments. And over time, the allotments have taken on a

capitalized value. Import quotas can be established for commodities that have price supports and marketing quotas to prevent disruption of these programs.

In the case of dairy production, Federal marketing orders have been used to control the amount of Class I milk entering the fluid milk market. Milk that is not allocated for the fluid market is used for manufacturing uses. Producers receive a blend price based on the proportion of fluid and manufacturing milk in their market area. The Government supports the overall price of milk by buying butter, cheese, and nonfat dried milk to maintain the announced support price.

From a policy standpoint, these programs are generally successful in assuring an adequate income for the producers of the commodities in question. Production has tended to remain in the hands of family operators when an acreage allotment has been required, expansion being possible only through the purchase of land with an allotment or by buying an allotment directly. Leasing of allotments has been permitted but the geographic area within which allotments can be transferred has been limited by program provisions. Since there is no allotment per se for dairy, it has been easier to expand dairy farming beyond a family-size operation.

These programs have a direct effect on food prices. While the supports have provided considerable price stability, consumer prices have usually been higher than what would be needed to elicit a given level of production. Also, resource returns have usually been higher for commodities that have price supports than for other commodities. Farmers with allotments have consequently practiced land and water conservation to a greater degree since productivity on the allotment acreage is rewarded.

Commodities currently under price support and quota provisions have not had the advantage of disaster payment programs like those that have been offered to wheat, feed grain, cotton, and rice program participants. Generally, however, these commodities have not been grown or produced in areas prone to natural disaster, particularly drought.

The individual producers of price supported commodities have been able to exercise their management prerogatives on production practices, generally showing substantial increases in yield or production. At the same time, little leeway has existed for marketing decisions since the support level sets the market price, leading to the practice of simply delivering the commodity to a handling point. Also, managers have not had the freedom to decide on production levels as the allotment or quota has dictated what could be produced. Dairy farmers have been limited as to how much Class I base allocation they could acquire.

Although the price support-marketing quota programs meet several policy objectives, they have received a good deal of criticism. Among the concerns expressed have been the following:

- The allotments prevent efficient producers from increasing production and tend to keep inefficient producers in production. The high price supports result in the allocation of more resources to the production of the commodity than what market supply and demand would dictate. Allotments prevent production from shifting among areas or regions in response to changes in comparative economic advantage.
- Controlling production through marketing quotas results in a capitalized value being attached to the allotment. In this situation, the original owner and the owner's heirs receive the full benefits of the price support. Subsequent buyers or renters do not get the intended advantage of the price support because the cost of land with an allotment or the cost to lease the allotment is increased. Producers who rent or buy allotments continue to seek higher price supports only to find that higher land prices or rents reduce the advantage of the higher supports. Policymakers find it difficult to reallocate or eliminate allotments because of the wealth and equity they represent to the current allotment holders.
- Consumers often assert that high price supports and quota restrictions result in higher than necessary food and fiber prices. Program supporters counter that the program results in an assured and stable supply.
- When commodity price supports were first used, the level of support was related to the parity price formula. The parity price formula has lost support over the years because of its 1910-14 base and because it does not explicitly take changes in productivity into account. Peanuts have most recently had their support separated from parity price concepts. The dairy price support continues to be parity-based. Parity is an expression of equity that will likely continue to surface as a program concept during the eighties. Alternative specifications of the parity formula may be proposed to overcome current shortcomings. Alternatively, however, at least some critics may argue for a more drastic restructuring of the dairy program to move it away from a parity basis.

Price Support Loan Programs

Several field crops are afforded price support through non-recourse loans. There are two differences between this program concept and the price support-marketing quota concept: marketing quotas are not applied in combination with non-recourse loans and loan levels are set at or below market clearing prices under most situations. Currently, soybeans,

oats, rye, and flax fall into this program category. The Government does not have a record of accumulating large inventories of these commodities.

The price support loan programs do not guarantee an adequate return to resources and they are not intended to assure farmers of an adequate level of income; loan rates are usually set in relation to anticipated market clearing levels. The major benefit of loan support is to provide downside price stability, particularly in years of abnormally large production and supply. The loan program also offers producers an immediate cash flow if they wish to hold the commodity for marketing or for feeding at a later time.

These loan programs have little direct effect on food prices as they do not raise prices above market clearing levels and they do not inhibit production adjustments on or between farms. Since farmers are eligible for loans only on what they produce, these loan programs do not offer any protection against natural disasters.

Freedom of individual decisionmaking is a strong point of these programs. Farmers determine the production level, production practices, and marketing plans for crops. Loan programs are generally neutral with respect to farm size; they give no advantage to larger farms in comparison with family-sized farms. These programs allow the covered commodities to be competitive in international trade and they offer no barrier to imports.

There is likely to be little pressure to change current loan programs from the standpoint of Government or consumer cost. Pressure for change would most likely come from producers seeking support for income in addition to price levels, protection against natural disasters, and assurance of resource returns. Of the commodities now eligible for price support loans, soybeans are most likely to be singled out for possible program change. Soybeans are now grown throughout the country by small and large producers alike. Soybeans have a huge export market and many farmers rely on soybeans for a large portion of their income. Thus, there is a large stake in stability, adequate resource returns, and income support.

Voluntary Price and Income Support Programs

The high loan rates of the forties, fifties, and early sixties stabilized prices and supported incomes. However, these supports were at a level such that market prices could not perform their allocative function. Market prices became administratively determined, causing farmers to produce in response to the loan program. The commodity policy objective that has emerged from this experience is that while price instability should be controlled within certain bounds, market prices should be allowed to vary in relation to supply and demand and transmit resource reallocation signals. This ob-

jective has led to a dual system of separate price supports and income supports provided through direct payments.

Voluntary price and income support programs began in the early sixties. These programs, referred to as target price programs since 1974, have evolved as a compromise between the mandatory price support-marketing quota program and the unobtrusive price support programs. A major feature of these programs is that they provide a price support loan set at market clearing levels plus a direct payment to farmers. The loan provides a downside price floor and interim financing for producers. Since 1974, the direct payment has been made if market prices fall below a preset target price. The target price level is aimed at ensuring income support to farm families as well as adequate resource returns. The target price deficiency payment is made outside the market so that the forces of supply and demand are allowed to operate unimpeded.

The direct deficiency payment rate is based on the difference between the target price and loan rate if the market price is below the loan rate. If the market price is above the loan rate but below the target price, the deficiency payment is based on the difference. If the market provides returns equivalent to or above the target price, the producer receives the entire return from the market. With the market price below the target price, the deficiency payment makes up the income difference to the producer without the Government having to acquire an inventory and intervene in the market allocation of supply.

Production costs have been used to determine and adjust target prices. In general, the target price assures a return that covers the resource input costs of an average producer, including labor, management, and a portion of the land costs. Because of debt financing, however, short-term cash flow requirements of individual farmers have often exceeded the level of economic returns necessary to cover their longrun cost of production. This has led to considerable debate over an appropriate target price level.

Protection Against Natural Disaster

A disaster payments program was added in 1973. This program provided producers with direct payments if a natural disaster either prevented planting a crop or drastically reduced yields. The disaster payments program was extended through 1979 by the 1977 Act and through 1981 by subsequent legislation. Prior to 1981, to be able to receive disaster payments, producers only had to participate in the voluntary price and income support program; no premium was required. Beginning with the 1981 crop, a new all risk crop insurance program will be instituted. Risk will be shared by producers and society, with producers required to pay a premium to offset part of the program's total cost. The Government will use tax dollars to cover the remaining cost. Producers still eligible for the disaster payments program in 1981 will be

able to choose between the disaster payments program and the crop insurance program.

Stocks and Reserves

The policy objective of price stability is related to market stockholding behavior. In a free market, private stockholders hold a level of stocks that equates expected stockholding costs with expected returns. Anticipation of a price change from one season to the next will raise or lower stocks, thus altering supplies available to the market in both seasons and causing prices in the two periods to converge. The price stabilizing function of stocks has led to a policy objective of a steady granary achieved through Government-managed reserves.

Government involvement in a reserve program arises out of a belief that private stockholders, acting independently, are not apt to carry a socially optimal level of reserves. The cost of carrying reserves can be high and the need for them may stem from totally unpredictable events. In this environment, society, through Government, is considered better able to bear the risk associated with large stock levels needed to prevent market disruption.

A farmer-owned grain reserve was added to the voluntary price and income support program in 1977. The reserve was designed to encourage storage of stocks when supplies were large to provide a reserve of grain that could be used whenever production shortfalls occurred. Under the price support-marketing quota programs, the Commodity Credit Corporation (CCC) acquired inventories through loan default. The CCC inventory functioned as a reserve and was used to meet demand when production lagged. Farm interests became increasingly opposed to CCC inventory actions, however, because they saw CCC moderating prices when demand was strong which reduced their income potential and the CCC, rather than producers, realized any financial gain on inventory actions. The CCC may still acquire inventories, but generally it is to the producer's advantage to use the farmer-owned grain reserve instead.

The reserve encourages producers to hold inventories by extending the nonrecourse loan up to 3 years and by making a direct payment to producers to offset storage costs. The reserve also sets announced guidelines for the release of the reserve and for the requirement that the loan be repaid. The release and call prices permit an orderly drawdown of reserve stocks. The reserve not only allows producers to realize possible gains on inventory action, but also allows them discretion in where and how much to market.

Payment Limitations

Since program benefits are provided in direct relation to production, producers can receive benefits regardless of need.

Payment limits were first imposed in 1970 in recognition of the disparity between payment level and need. Evidence suggests that the limitation has not affected very many producers, however.

Resource Conservation

The voluntary price and income programs have no direct provisions that relate to conservation. Program regulations require only that appropriate conservation practices be followed on land placed in set-aside and diversion programs. This has generally involved maintenance of an appropriate cover crop to prevent wind erosion and unchecked weed growth. How land is used and what conservation practices may be applied, except for the set-aside and diversion requirements, is left to individual decisionmakers.

A particular goal of all these voluntary programs has been to allow as much individual producer decisionmaking as possible. Producers are not required to participate, but non-participants are ineligible for direct program benefits. The principal restriction producers face is that they cannot grow crops which have a marketing quota. There are no allotment restrictions on the voluntary program crops. This allows acreage to shift according to comparative economic advantage. Rice is the exception in that only historical allotment holders are eligible for benefits. But growers are not required to hold an allotment to grow rice.

The voluntary programs have been designed to be consistent with the development of export markets for the grains and cotton. Loan rates are established in light of world market price levels, the reserve, and land diversion provisions that keep production in line with demand while assuring dependable supplies to all users.

Issues that will likely arise over the voluntary programs in 1981 include the following:

- The target price adjustment provision has not worked satisfactorily because adjustments have not adequately tracked cost changes faced by farmers. Some have argued that a target price may not even be necessary given the prospect of higher commodity prices in the eighties and/or the use of reserve programs. If the target price is retained, a different procedure will be required for establishing its base and for making adjustments that better reflect changes in costs, prices, yields, and any set-aside or diversion requirements.
- Policymakers will continue to debate and develop rationale for appropriate relationships among loan rates, target prices, reserve release and call prices, and CCC inventory sales prices.

- Program benefits do not correlate with the income needs of individual farm families. During the seventies, the response on this issue was to establish payment limitations. The small farm provisions that were written into the programs in the sixties disappeared during the seventies. Numerous suggestions and proposals have surfaced including adjusting the payment limit levels, limiting the amount of production eligible for benefits, eliminating direct payments in favor of individual welfare concepts, and setting target prices on the basis of regional production costs.
- There is the possibility that more commodities will be added to the general voluntary price and income framework. Soybeans and peanuts have been mentioned as possibilities.
- A link between commodity programs and conservation practices has been mentioned.

Commodities Without Programs

Sunflowers, cattle, and hogs are major commodities that do not have direct commodity programs. (Although the imposition of import quotas on various meat products does provide some indirect livestock price support.) These commodities are major income producers on many farms, have direct relevance to food prices, are subject to weather and economic instability, have a price that is determined by the interaction of supply and demand, have production levels determined by individual producers, and figure in world trade. These commodities also face the same general problems and exhibit many of the same characteristics that have been cited as rationale for including other commodities under the commodity program umbrella. The fact that the majority of all-farm receipts are generated from livestock raises the significance of this issue to policymakers.

Livestock producers faced heavy losses in the seventies, resulting in part from increased feed prices. As competition for grain increases for export and alcohol production during the eighties, there will be greater potential for grain price variation. Although this will place greater emphasis on the grain reserve, there could still be large variations in grain prices. Developing some form of income support or price stability for livestock producers is a possible issue. The focus of support could be equity among crop and livestock producers, an objective that has seemingly been overlooked as programs have been developed to support the prices and income of grain and fiber producers.

There has already been political pressure and policy debate over the issue of a commodity program for sunflowers. A large proportion of sunflower production is exported either as oil or as seed. This gives added impetus for a program to aid in market stability and guide aggregate production levels

in relation to expected demand. The inclusion of sunflowers in a comprehensive oilseeds program has also been discussed.

Concluding Perspective

Policies developed to assist particular sectors of the U.S. economy reflect both public and privately held goals. Among the goals held for farm commodity policy are adequate farm income, price and income stability, assurance of production capacity through adequate returns and conservation of natural resources, support for individual decisionmaking, market determined prices, global free trade, adequate supply of high quality food, and reasonable food prices. By their nature, these various goals will at times conflict with one another. Commodity policies implemented during the eighties will therefore most likely continue to reflect a compromise among them.

Price and income policies will likely focus on overall market stability. Individual farmers will continue to incur periodic income loss due to weather and other production or marketing problems. A high degree of interannual market variability can be expected, particularly due to the role of the United States as a dominant world supplier which unilaterally adheres to an open market concept. The farmer-owned reserve could come to play an even greater role as a policy tool as policymakers move to deal with the issue of stability. Stability for crop farmers, moreover, influences directly the economic climate for livestock producers and ultimately, consumers. The reserve is usually viewed as a tool that can be used to both boost farm prices by removing stocks from the market and to keep an upper limit on food prices by encouraging the return of stocks to the market as needed. Farmers, rather than Government, stand to benefit from the intervening price increases. Thus, at least in the political arena, the

reserve has become a tool which is politically palatable to a wide diversity of interests.

Direct payment programs, such as target price deficiency payments, could come under increasing budget pressure. Direct payments cannot be made large enough—as a practical political matter—to have much effect on the income of individual operators, except for a few very large operators. This is particularly true during a period of budget consciousness when each Government program is challenged as to its contribution to society's well-being. Evidence also suggests that most direct payments go to larger operators who may have less need for income supplements. These factors are another reason some analysts conclude that the reserve, which transmits its benefits through the market and which tends to be more size neutral, will come into increasing prominence during the eighties.

With the considerable pressure that will be placed on U.S. agriculture to meet a burgeoning world demand, it can be expected that there will be a renewed focus on agricultural research directed toward efficiency, productivity, and production capacity. Although agriculture remains a bright spot in our national economy, a great many questions are being raised because agricultural productivity has seemingly leveled off in recent years.

Great emphasis is also likely to be placed on maximum use of the available natural resource base. The question of near-term profits versus future production potential will no doubt be raised. Concern has arisen in recent years, for example, that the United States is undermining its longrun farm production capacity through reduced water tables and eroding topsoil.

Global Prospects

Changes in the Farm Sector

Inflation

Capacity for Greater Production

Transportation

Trade Issues

Commodity Programs

Policy Setting

The Setting for New Food and Agricultural Legislation

Douglas E. Bowers*

The political position of U.S. agriculture has been altered over the past few years in such a way that agricultural policy-making has become more complex and difficult. New voices challenge the once comfortable policy triangle between Congress, the U.S. Department of Agriculture (USDA), and agricultural interest groups. Food price inflation, budget deficits, concern for the environment, the energy shortage, and the surge of agricultural exports in an era of trade deficits have created widespread interest in agriculture, even as the number of farmers declines. Within Congress, recent reforms have decentralized the locus of power on agricultural issues. Within the executive branch, the leadership of USDA has been eroded by the entry of other agencies into agricultural policy-making. A host of nonagricultural interest groups has appeared that seeks to influence the whole spectrum of agricultural and food policy. Within farm groups themselves, the strength of the general farm organizations has weakened while that of commodity groups has grown (19, pp. 1-7; 29, pp. 1-11).¹

This paper explores the political developments that have changed the context of agricultural legislation and examines the various interest groups that will participate in shaping new food and agricultural legislation.

Events since the 1977 Food and Agriculture Act have caused farmers to ask for more Government aid while the administration and Congress have become more wary of increasing expenditures. Costs to agricultural producers—those for energy, machinery, fertilizer, and labor—have soared. Periods of high interest rates and tight money have made it difficult for farmers to obtain credit. The growing importance of agricultural exports in the seventies has made American farmers more vulnerable to short-term price swings and political developments in other parts of the world. The January 1980 suspension of grain exports to the Soviet Union led farmers to question whether they will be able to rely on exports in the eighties to the same extent that they did in the seventies. Because of these developments, many farmers now demand Government protection from domestic inflation and international politics.

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¹ Italicized numbers in parentheses refer to items in the References section at the end of this article.

Congress and the administration, on the other hand, have been concerned with the recession and the inflationary effects of the large Federal budget deficit. Both have looked critically at any attempt to raise spending. The election results in 1980 point to an even more fiscally conservative Congress and administration in 1981. Moreover, interest in tightening the budget has occurred at a time when many aspects of traditional agricultural policy are being questioned. A number of groups advocating reform have come to prominence in the past decade. Family farm proponents have complained that Federal policies foster large-scale farms at the expense of small farms.

Environmentalists have criticized the soil depletion effects of the full production policies of the seventies. Consumer groups have attacked some of the more expensive agricultural programs as a waste of taxpayer money and an unnecessary addition to food prices. All these organizations will get a sympathetic hearing from at least some segments of the Government. Thus, as the time for consideration of new agricultural legislation approaches, farmers cannot be certain that they will be able to obtain the sort of act they desire; other interests may significantly alter proposals from the farm States.

Agriculture's Position in Congress and the Executive Branch

Changes within Congress during the past decade created a new and less friendly atmosphere for agriculture. One of the largest shifts was the decline of rural representatives, both in total number and leadership positions. The House changed most; the majority Democratic Party came increasingly from the urban centers of the North. The rural southern representatives that once dominated committee chairmanships gradually gave way to urban northerners. Due to urbanization nationwide, few house districts anywhere are still predominantly rural (24, pp. 15-18). Nearly all Senators, on the other hand, continue to have at least some rural constituents and thus, the Senate tends to treat agriculture more favorably. But here, too, urban influence has grown. Consequently, agricultural legislation must face a highly urban Congress. The congressional agriculture committees, which still write most farm bills, remain in rural hands, but there has been a noticeable regional shift. Between 1970 and to 1981, southerners

on the House committee slipped from 48.6 percent to 37.2 percent; on the Senate committee, southerners declined from 46.2 percent (including all but one Democrat) to 35.3 percent (31: 1970, pp. 252, 264; *Washington Farmletter*, Jan. 30, Feb. 13, 1981). Most new members are from either the Midwest or West, which has moved the focus of interest away from southern crops.

Procedural Reforms

Equally important to food and agricultural legislation have been procedural reforms in Congress in the midseventies affecting the distribution of power and the way bills are passed. One line of reform attempted to centralize power. House Democrats, for example, used their party caucus to strengthen party control over policy and committee assignments. More significant for agriculture, Congress in 1974 initiated a new procedure to make budget development more efficient and to increase Congress' authority in relation to the President. The Budget and Impoundment Act of 1974 created budget committees in both houses as well as a Congressional Budget Office to provide the expertise that many felt had been lacking in Congress' financial work. Committees must report their budget recommendations to the budget committees by March 15, according to the timetable set forth in the act. The budget committees also consider the President's proposals and the advice of the Congressional Budget Office. By April 15, the House and Senate budget committees are required to report their versions of the budget and, by May 15, the initial budget resolution setting congressional target guidelines has to be passed. No authorization bill can be reported after May 15 or considered on the floor before that date. From that point on, the appropriations committees take over the process, with deadlines for finishing in September. The second budget resolution, to be passed by September 15, becomes binding on Congress.

The new budget procedure made Congress more conscious of expenditures and reluctant to violate its own guidelines. Agriculture's position in the budget is somewhat more flexible than other areas, since exact appropriations depend on such unpredictable factors as weather and export demand. But the new procedures have made it more difficult to pass sudden increases in appropriations. For example, farmers wanting higher target prices in November 1979 for the 1979 crop year faced an obstacle from congressional procedures that permit appropriations increases for the current fiscal year to be defeated by a simple point of order on the floor. Similarly, when the Congressional Budget Office reported in early March 1980 that fiscal 1980 spending was running substantially higher than allowed by the second budget resolution for 1980, all bills requiring extra spending were automatically removed from the calendar until a new budget resolution could be passed (8: 1974, pp. 145-153; 1975, pp. 26-30; 24, pp. 20-21; 40, pp. 7-8; 44, pp. 37-42).²

² *Congressional Quarterly Weekly Report*, Mar. 8, 1980, p. 640.

Although the budget reforms were aimed at centralizing planning, other changes in Congress decentralized power. Democratic liberals spearheaded reforms during the mid-seventies to reduce the near autocratic power of some committee chairmen and to democratize leadership. Most of these changes occurred in the House, which had a less open style of leadership than the Senate. In order to circumvent the seniority system by which the most senior majority member of a committee automatically became its chairman, the Democratic caucus in 1975 began requiring a secret ballot for the election of chairmen. Three important chairmen lost their positions that year. Other changes in this period required committees to have written rules, spread committee assignments more evenly, and took away the right of chairmen to kill bills by simply pocketing them.

While committee chairmen lost power, subcommittees were gaining it. Democratic subcommittee chairmen were now to be chosen by a caucus of Democrats on the committee. Thus, relatively inexperienced members could be chosen to fill important subcommittee posts. Subcommittees received the right to hire staff members, a privilege that gave them more independence from the chairmen of the full committees. The number of subcommittees also significantly increased. These changes spread power from a small group of senior committee chairmen to a much larger body of members. At the same time, the House opened up most committee meetings to the public and began recording teller votes. This made it easier for lobbyists and constituents to keep tabs on what individual congressmen were doing. The Senate also opened its committee meetings, added to committee staffs, and made it simpler to require secret ballots for the election of chairmen (20, pp. 88-114; 24, pp. 15-22; 8: 1974, p. 4; 1975, pp. 26-40).

The result of these various reforms was a Congress less highly organized and more difficult to manage than previous Congresses. Indeed, by the 96th Congress, many members felt that the changes had caused too much fragmentation. The earlier gentlemen's agreements that had governed Senate behavior were breaking down before a rise in obstructionism, especially the use of the filibuster. The House became increasingly unwieldy as old centers of power crumbled. Lobbyists—including farm lobbyists—found their work more difficult and less predictable because they could no longer deal with just a few strong members. The influx of new members not bound by old conventions—75 freshman Democrats in 1975, for example—hastened this change (8, 1978, pp. 3-8).

Thomas S. Foley's accession to the House Agriculture Committee chairmanship in 1975 illustrates both the reform process and how it affected agriculture. The previous Agriculture Committee chairman, W. R. Poage, was a traditional style leader who ran the committee with a strong hand. Foley took a more democratic approach than Poage and was re-

warded with a standing ovation for his role in the 1977 farm bill. However, his style of leadership encouraged opposition to the committee's decisions and made it more difficult for farm representatives to deal with the committee. Under the old system, decisions made in committee usually held up well in the full House. But during consideration of the 1977 bill, Foley found himself battling subcommittee chairmen who brought up amendments on the floor which had been defeated in committee. This made it easier for liberal and consumer interests to pick apart agreements worked out in committee and make a direct appeal to the mostly urban House. The narrow escape of the peanut program and the increase in grain loan and target levels on the floor showed how the committee's role had declined (23, pp. 23, 26-33).

The Congressional Agriculture Committees

The 1981 House Agriculture Committee reflects the changes of the last few years. Only 5 of the 10 most senior Democrats are southerners (compared with 8 of 10 in 1970), although the chairmanship (de la Garza, Texas) returned to southern hands in the new Congress. Turnover has been high. Of its 1981 membership of 43, 20 have joined since 1977, 26 since 1975, and 38 since 1970. In 1975 alone, 18 freshmen appeared, followed by 9 in 1977, 7 in 1979, and 10 in 1981 (31: 1970, p. 264; 1975, p. 281; 1977, pp. 276-277; 1979, pp. 282-283). The committee remains overwhelmingly rural despite its shifting membership. Only Richmond of New York represents an urban area. This year 13 members retired, ran for the Senate, lost, or switched committees (Sebelius, Nolan, Mathis, Johnson, Skelton, Akaka, Hance, Madigan, Heckler, Grassley, Symms, Baldus, and Kelly). The greatest change has been Foley's resignation as chairman in order to become Democratic whip. Foley is, however, expected to play an important role in the committee's deliberations. The new chairman, de la Garza of Texas, has been on the Agriculture Committee since 1965. As head of the Subcommittee on Department Investigations, Oversight, and Research, he was one of the leading subcommittee chairmen and a noted supporter of agricultural research. He has also been active in sugar legislation. The subcommittees were also reorganized in 1981. Traditionally stronger and more institutionalized than their Senate counterparts, the House subcommittees went through their biggest shakeup in many years, dropping in number from 10 to 8. Independent subcommittees on cotton, tobacco, and forests were combined with others and a new committee on Wheat, Soybeans, and Feed Grains was created, with Foley at its head. Only five of the subcommittee chairmen were chairmen in the previous Congress. The minority side also underwent major change on the subcommittees. The seven Republicans leaving—Sebelius, Kelly, Symms, Madigan, Grassley, Heckler, and Johnson—were all ranking minority subcommittee members. Nevertheless, the committee drafting 1981 legislation will have more experienced members than

the one that wrote the 1977 law. Over half (23) have been on the Committee since 1977, compared with just 16 of 46 members in 1977 who had helped draft the 1973 farm bill. Thus, despite the change in leadership, the behavior of the committee in 1981 may be similar to that of 1977, with the difference that farmer demands are now greater and committee members are responsive to those demands.

House committee members are a diverse lot whose individual beliefs are more affected by the needs of their constituents than party ties. Members of wheat States, without regard to party, have usually favored higher wheat supports; cotton representatives have favored higher cotton supports; and so on. Chairman Foley represented a wheat State and usually supported that interest. But he was also a notable defender of the Carter administration's attempts to keep agricultural expenditures down to reduce budget deficits. Foley also had broader interests than most agriculture chairmen, heading the Democratic Study Group and the Democratic caucus at various times. It is difficult to separate House Agriculture Committee members by ideology but a few distinct groups can be singled out. In 1977, an alliance of Democrats, which one writer labeled the "reformers," pushed for higher price supports for grain in opposition to Foley: English (Oklahoma), Nolan (Minnesota), Harkin (Iowa), Krebs (California), Bedell (Iowa), Panetta (California), Fithian (Indiana), and Glickman (Kansas). English, Nolan, and Fithian were especially aggressive in making amendments to the committee bill on the floor (23, p. 29). Ratings by the National Farmers Union (NFU) on the agriculture-related votes by House committee members during 1979 also offer some clues as to ideology. The NFU gave high ratings to members supporting generous foreign aid, food stamps, sugar and milk support programs, the International Sugar Agreement, USDA appropriations, and setting aside oil for agriculture during shortages. The NFU opposed limiting cattle hide exports and raising the meat import quota and also took stands on a few nonagricultural issues. Committee members that gave nearly unanimous support to the NFU positions were Coelho (California), Brown (California), Mathis (Georgia), Fithian (Indiana), Harkin (Iowa), Bedell (Iowa), Nolan (Minnesota), Skelton (Missouri), Daschle (South Dakota), Jeffords (Vermont), and Baldus (Wisconsin).³ Among members who urged more restraint in spending were Findley (Illinois) and Rose (North Carolina), the latter chairman of the Subcommittee on Livestock and Grains, who generally agreed with the administration's restraint-on-spending stands (35, p. 33).⁴ The strongest fiscal conservative on the committee was the recently defeated Kelly (Florida); he was joined by Hagedorn (Minnesota) at the bottom of the NFU's rankings. The two urban representatives, Heckler (Massachusetts) and

³ National Farmers Union, *Washington Newsletter*, Mar. 8, 1980. These committee members cast no more than 2 out of 18 votes against the NFU's positions.

⁴ *Washington Agricultural Record*, Mar. 7, 1980.

Richmond (New York), were also the most prominent consumer advocates on the committee. But, while Heckler led a direct attack on certain agricultural programs, like peanuts and sugar, Richmond served as a bridge between rural and urban congressmen. Heckler left the committee in 1981.

The Senate Committee on Agriculture, Nutrition, and Forestry operates more informally than does the House committee. There are eight subcommittees, and unlike those of the House, none of them deals with specific commodities. Subcommittee chairmen have more leeway to follow their own interests than those in the House. They have also been allowed to manage their own bills on the floor. The two parties have been more evenly divided here, with the Democrats having a majority of only two on the full committee during the 96th Congress. Three subcommittees were evenly split by parties. The committee has nine Republicans to just eight Democrats in 1981. The Senate committee has been even less stable in its membership than that of the House. Of the 17 members in 1981, 9 are new since 1977, 13 since 1975, and 16 since 1970. Seven are from the South, 1 from the Northeast, and the remainder from the West and Midwest (31: 1970, p. 252; 1975, p. 252; 1977, p. 250; 1979, p. 256). Some of the leading lights on the committee from the recent past are gone now, such as Senators Humphrey, Eastland, and Aiken. Senator Young retired in 1980 and Senators Talmadge, McGovern, Stewart, and Stone were defeated for reelection. Among members of the 1980 committee, chairman Herman E. Talmadge of Georgia was able to maintain more unity than Foley, a fact appreciated by Washington lobbyists. McGovern, Zorinsky, and Young were notably strong in favoring higher grain supports, while Helms took a harder line on the budget and food stamps than most of the committee. NFU ratings of Senators on the Agriculture Committee for 1979 put Leahy (Vermont), McGovern (South Dakota), Stewart (Alabama), and Stone (Florida) at the highest level and Helms (North Carolina), Jepsen (Iowa), and Lugar (Indiana) at the lowest. The ratings were based on support for the food stamp, school milk, and crop insurance programs, the International Sugar Agreement, and the use of windfall oil profits to aid railroads as well as opposition to cuts in USDA appropriations and increasing acreage limits on irrigated land.⁵ As with the House committee, constituency is more important than party in determining votes on agriculture. It has not been uncommon to find such otherwise differing Senators as Dole and McGovern working closely together on agricultural legislation, as they have on child nutrition. Republicans now have a majority in the Senate for the first time since the fifties, with Jesse Helms (North Carolina) appointed chairman of the Agriculture Committee. Helms'

emphasis on fiscal conservatism may bring changes to Senate agricultural policies especially on domestic food aid. There has also been a substantial alteration on the subcommittees. Perhaps the most prominent new subcommittee chairman is Thad Cochran (Mississippi) who will head both the Agricultural Production, Marketing, and Stabilization Committee and the Appropriation Committee's Subcommittee on Agriculture.

Influence of Other Committees

Members of Congress outside the agriculture committees also have an important function in making agricultural policy. The House and Senate budget committees serve as guardians of the budget and generally oppose any increase in expenditures above their budget guidelines. Both have new, fiscally conservative chairmen for 1981, Jones (Oklahoma) in the House and Domenici (New Mexico) in the Senate. The foreign relations committees have a major say in trade issues. Senator Church, chairman of the Senate Foreign Relations Committee until his defeat in 1980, held up the International Sugar Agreement for 2 years because the administration refused to provide for new domestic price supports. The House Foreign Affairs Committee approved an emergency foreign aid wheat reserve in February 1980 over the objections of wheat growers. Other committees that deal with agricultural issues include those on finances (tariffs, import quotas), interior and environment (reclamation), science (soil problems), small business (antitrust actions), and judiciary (farmer cooperatives).

The appropriations committees and their agricultural subcommittees play a special role. In addition to having direct responsibility for internal USDA spending, they must approve all specific agricultural appropriations. The agriculture committees write the basic legislation but the appropriations committees are often able to add their own ideas. The two committees work closely with each other. The chairman of the House agricultural subcommittee, Jamie Whitten (Mississippi), has been a major power in agriculture for over 30 years. On the Senate side, the departures of Bellmon and Young opened the way for Thad Cochran (Mississippi) to replace Eagleton as chairman of the Senate agriculture subcommittee in the 97th Congress.

Interagency Influences

Within the executive branch, interest in agricultural policy has also expanded beyond the Department of Agriculture, although, as in the case of the congressional agriculture committees, the Department still plays the major role. The same events that awakened nonagricultural interest groups to the importance of agricultural policy have also spurred other executive departments to use their influence more in agriculture. Responding to a mostly urban constituency, they

⁵ National Farmers Union, *Washington Newsletter*, Mar. 7, 1980. High-rated Senators had no more than 4 of 23 test votes against the NFU; low-rated ones scored at least 10 against NFU positions.

have often been at odds with USDA, chiefly on inflation and Government expenditures. During the Nixon administration, the Cost of Living Council was a catalyst in making export policy a tool to fight inflation. Other agencies joined in at various times. The Commerce Department imposed an embargo on soybean and cottonseed exports in 1973 as a means to stop spiraling prices. That year, the Government also froze beef prices for the same reason (25, pp. 19-21).⁶ In 1975, grain sales to the Soviet Union and Poland were halted under pressure from the Labor Department and labor unions concerned with the inflationary effects of huge Russian grain purchases. The suspension against Poland was imposed by the State Department without consulting USDA (4).⁷ At other times, the White House lowered barriers to meat and dairy imports. On budgetary considerations, the Office of Management and Budget, Council of Economic Advisers, and the Treasury Department all have an interest in seeing agricultural, as well as other expenses, kept in line with the overall budget. In recognition of how many agencies were having an input into agricultural programs, the Ford administration created the Agricultural Policy Committee to advise the White House. Its successor under President Carter, the Food and Agricultural Policy Working Group, contained representatives from most of the above mentioned agencies plus the Domestic Policy Staff and the President's Special Assistant for Consumer Affairs (18, pp. 3-6, 11-14; 10, pp. 13-16; 2, p. 396; 15, pp. 141-145). Agricultural policy has also been affected by actions of the Food and Drug Administration and the Environmental Protection Agency, which have banned a number of feed additives and pesticides.

Interest Groups and Farm Policy, 1973-81

Traditionally, farm policy was made by the interaction of major farm organizations with Congress and the executive branch. But the advent of new issues, which brought a broader spectrum of interest groups into the agricultural arena, and the decline of the farm bloc in Congress made agriculture's position more difficult. The principal strategy used over the years was to write omnibus farm bills, which combined the interests of each commodity group in one bill. By bringing the different segments of agriculture together, it was usually possible to muster enough support in Congress to pass the bill. But, as surpluses began to disappear in the sixties and early seventies, urban representatives no longer felt it necessary to give automatic support to an expensive system of relief for agriculture. Rural congressmen in the sixties began to explicitly trade votes with urban members on such bills as food stamps and minimum wages in order to insure their support. It was a coalition

of urban and rural interests that put through the agricultural acts of 1965 and 1970, as well as other legislation (1, pp. 148-151; 23, pp. 24-25).

Subsidies Attacked

There were ample signs by 1973 that urban interests were gaining a greater role in farm policy. Farm programs for small crops or those that seemed too favorable to producers became vulnerable to attack. In response to high food prices and increased world demand for American agricultural products, the Nixon administration proposed phasing out the system of price supports in favor of free market prices and production controls that would be used only when necessary. The American Farm Bureau Federation (AFBF) endorsed this approach but about 30 other major farm groups, which joined together in the National Farm Coalition (NFC), not only opposed the new plan but demanded higher price supports. The act which emerged from Congress generally pleased farm organizations. Although its stated purpose was to increase production and reduce Government expenditures, it retained relatively high loans and added a new system of target prices. Only the AFBF attacked the Agriculture and Consumer Protection Act of 1973 as "a hoax . . . that would keep farmers dependent on subsidies."⁸

More revealing about the relationships between interest groups, however, was what happened to cotton and some of the smaller crops. Here, the previous unity in agriculture showed signs of strain. Cotton was once the major force in farm legislation because of the prominence of southerners on the agriculture committees. But, in 1973, large cotton farmers faced a threat in the form of a strict \$20,000 payment limit per farmer. No longer able to rely on the strength of the traditional agricultural coalition, cotton State representatives sought out their own alliances, first with the administration in exchange for opposing the escalator clause (target prices to rise with costs of production) and then with organized labor in exchange for opposing a ban on food stamps to strikers. Neither tactic garnered enough support to prevent the limit from passing. Other highly subsidized segments of agriculture also came under attack in the same period. Sugar producers lost their fight in 1974 to extend the 40-year old program of sugar payments despite an alliance with organized labor. The same year, President Ford called for ending all acreage limitations on rice, peanuts, and cotton. In 1976, rice was removed from the restrictive allotment system and put under target prices, and the peanut program came under attack from Agriculture Secretary Butz (23, p. 24; 16, p. 8; 8: 1974, pp. 225-230; 1975, pp. 389, 393-394). While these crops were having their troubles, the less controversial demands of wheat and feed grain producers succeeded with little opposition and a good bit of

⁶ *Wall Street Journal*, June 28, 1973; *Washington Post*, Aug. 2, 1973.

⁷ *Washington Post*, Sept. 11, 12, 29, 1975; *Congressional Record*, Sept. 11, 1975, S 15841-15842.

⁸ *Farm Bureau News*, July 30, 1973.

labor support in return for votes on the minimum wage bill. During 1973, the "wheat and food grains-labor alliance emerged as potentially the most stable cluster of interests in agricultural policymaking," according to one commentator (23, p. 25; 8, 1973, pp. 285-307; 1, p. 150).

As farm prices began to decline from their 1973-75 highs, some farm groups asked for a return to higher price supports. They were also upset with the grain embargo in 1975. A 1975 bill to increase target prices for grain and cotton, to add soybeans to the loan program, and to adjust dairy supports quarterly was vetoed by President Ford for budgetary reasons. During the 1976 election campaign, however, Ford increased the loan rates for grains, raised dairy support prices, sharply increased the duty on sugar, and set up the first quota on imported meat in over a decade.

President Carter met a storm of opposition from farm groups when the administration proposal for the 1977 farm bill failed to substantially raise target prices and loan rates. The National Farm Coalition came together again to advocate a counterproposal, agreeable to a large segment of farmers, to include higher target and loan levels (both related to the costs of production), new allotments based on recent production, farmer-held reserves, extension of food stamps and P.L. 480, and improvement of disaster programs. It avoided taking stands on such controversial issues as sugar, peanuts, rice, and payment limitations. The NFC consensus had wide appeal despite the absence of both the NFU and AFBF from the coalition. The Farmers Union held out for higher price supports and insisted on parity rather than cost of production as the basis for payments. The Farm Bureau continued to oppose increases in price supports.

The National Farm Coalition generally got its way in Congress, although once again there was a marked difference between the success of wheat and feed grains and that of smaller crops. Both the House and Senate committees, prodded by farm groups, set price and income supports at higher levels than the President wanted. The House came the closest to Carter's proposals. House Agriculture Committee Chairman Foley tried to hold target and loan levels down to prevent a veto but faced a challenge on the floor from mid-western representatives. After a broadly based lobbying effort, grain interests secured the support of labor and consumer groups through vote trading on the minimum wage and the proposed Consumer Protection Agency. Foley backed down and the amendment raising target prices and loans passed. Two controversial programs, sugar and peanuts, also had some success, but by closer margins. A provision to re-establish the sugar price support program passed with labor backing but with opposition from the administration, consumer groups, and processors, who limited it to 2 years. Consumer groups also supported and nearly carried an amendment in the House that would have sharply cut back the

peanut program. The farm bill also narrowly escaped amendments by a group of reformers to limit payments to both corporate farms and to farms in general. That farm interests generally succeeded was in large part attributable to the rural-urban coalition managed by Congressman Richmond of New York, a member of the Agriculture Committee (23, pp. 23-35; 11, pp. 8-20; 8, 1977, pp. 417-434; 22, pp. 9-46; 17, pp. 47-72).

A New Lobbying Force

Depressed prices and high debts brought a strong new lobby to Washington in 1978 in the form of the American Agriculture Movement (AAM). It consisted largely of new farmers and those who had recently expanded their farming operations. Hard hit by economic problems, they demanded 100 percent of parity, strict import controls, and producer control of farm policy. Opposition from the administration, more conservative farm groups like the Farm Bureau, and church and consumer organizations, which feared further inflation, led to defeat of AAM's more radical proposals. But their aggressive lobbying style, in and out of Congress, resulted in the passage of several programs in a year when no major agricultural legislation had been expected. The Emergency Farm Bill allowed the Secretary of Agriculture to raise target prices whenever a set-aside was in effect. A new farm loan program authorized \$4 billion in emergency loans. AAM also won a moratorium on Farmers Home Administration loan foreclosures. A flexible parity bill that would have substantially raised Government aid to agriculture was killed by the House only after it had passed through the conference committee. AAM showed that a militant lobby could influence Congress (8, 1978, pp. 435-450; 27, pp. 13-16).

Despite AAM's relative success, Congress in 1978 and 1979 remained reluctant to pass farm legislation that threatened to increase inflation or the Federal deficit. It had the support of consumer groups and the Carter administration. Another AAM lobby in 1979 for higher loan rates failed after strong objections from the administration. A 1978 proposal to raise sugar prices through import fees and quotas had the backing of sugar and corn producers and sugar beet refiners as well as organized labor, which supported the guarantees to sugar workers that were traditionally a part of the bill. Consumers, the administration, and industrial users of sugar favored a less generous version. But after the conference committee authorized direct payments for 1979 and adopted a relatively low target price, enough representatives from corn and sugar States turned against it to defeat the measure in the House. Another attempt to pass a sugar bill in 1979 had administration support but was killed by an alliance of consumers and industry, this time joined by labor and Hawaiian producers, who objected to the bill's \$50,000 limit on payments. Of 155 urban and suburban members voting on the bill, only 29 favored it. When the House passed the International Sugar

Agreement in March 1980, it included a provision requiring the President to take action to protect consumers against large price increases (8, 1978, pp. 462-467).⁹

Farmers also felt the opposition of consumers when the President vetoed a meat import quota bill in 1978 because it limited his authority to fight inflation by suspending quotas, a power that had been exercised in the past. A similar bill with more flexibility for the President was approved in 1979. Pressure to keep agricultural spending down was largely behind a move to phase out disaster payments and replace them with crop insurance subsidized by the Government. The plan had success in Congress despite objections from groups like the Farm Bureau which have their own insurance programs (8, 1978, pp. 460-462).¹⁰

Soviet Suspension Draws Sharp Reaction

The partial suspension of U.S. agricultural sales to the Soviet Union in January 1980 brought another wave of pressure from farm groups on Congress and the administration to provide better support for farm prices. Most farm groups reluctantly went along with the embargo on the understanding that the Government would increase subsidies to make up for losses. The strongest reaction came from AAM, which called for Bergland's resignation and held another Washington demonstration in February. Just as the effects of the embargo began to sink in, farmers faced another crisis in the form of a credit crunch during the planting season. Abnormally high interest rates made it expensive to buy inputs and a few farmers were unable to obtain credit at any price. Along with tight money, inflation was escalating the cost of production to new highs. Farm groups predicted widespread bankruptcies.¹¹

USDA responded to the suspension by buying the grain which had been earmarked for the Soviet Union and by assuming exporters' contracts. It also raised loan rates for wheat and corn, forgave interest on the first year of grain loans going into the reserve, and increased export credits. An already planned 7-percent increase in grain target prices passed Congress in March. For the credit problem, the administration supported an extension of the 1978 emergency bill that would make \$2 billion more in Government credit available. Bergland took the administration's views directly to the farmers in several visits to grain States. But most farm organizations felt that the Department's actions were not enough to

keep prices from falling. The National Association of Wheat Growers called them "totally inadequate." AAM demanded still higher supports and aid for gasohol production. Even the conservative Farm Bureau asked that all farmers be made eligible for price and income supports.¹²

Recent Developments

Farm organizations almost universally expressed disappointment in USDA's late February 1980 announcement that a widely expected paid land diversion program for grain would not be instituted. Meanwhile, the congressional agricultural committees, with an eye to the fall elections, went ahead with several new bills more to the liking of farmers. Both committees in March reported paid diversion programs, loan rates higher than target prices, sharp increases in supports during embargoes, and a provision opening the 1979 reserve loan program to farmers who had not participated in the set-aside. Because these bills carried high price tags, their prospects on the floor were slim. Furthermore, the administration made it clear that budgetary considerations would be paramount in 1980. Not only did the administration hint at a veto of greater price support spending, it brought up the possibility of abolishing acreage limits on peanuts and threatened a veto on the emergency farm credit bill unless the interest rate subsidy in it was removed. The Senate Agriculture Committee in March cut back some of its most expensive proposals in response to the pressure. Neither the House nor the Senate bills made much progress on the floor. Rising prices because of a severe drought during the summer and an easing of the credit crunch took some of the urgency out of demands for higher price and income supports. Nevertheless, as the election approached, the demands of farm State legislators and farm groups began to have more weight in both Congress and the administration. In late July, the President agreed to boost loan levels on corn, wheat, and soybeans in line with a bill that had come out of the Senate a few days earlier. A bill passed in November increased supports for grain in the farmer-held reserve and set up a new emergency foreign aid reserve. Meanwhile, a bill aimed at repealing the Soviet grain suspension passed the Senate in September in spite of administration veto threats.¹³

¹² *Kansas City Times*, Mar. 10, 1980; National Association of Wheat Growers, "Embargo Policy," Jan. 17, 1980; *Fargo-Moorhead Forum*, Jan. 8, 17, 1980; *Chicago Tribune*, Jan. 10, 1980; *Washington Post*, Feb. 19, 1980; *Congressional Quarterly Weekly Report*: Mar. 8, 1980, p. 695; Mar. 29, 1980, p. 870.

¹³ *Washington Farmletter*, Feb. 29, 1980; *Farm Times*, Mar. 18, 1980; *Journal of Commerce*, Mar. 7, 19, 27, 1980; *Congressional Quarterly Weekly Report*: Mar. 15, 1980, p. 751, Mar. 22, 1980, pp. 829-830; Aug. 2, 1980, pp. 2,205-2,206; Sept. 27, 1980, p. 2,876; Oct. 18, 1980, p. 3,175; Nov. 22, 1980, pp. 3417-3418; *Des Moines Register*, Mar. 22, 1980; *Atlanta Constitution*, Mar. 26, 1980; *Washington Star*, June 21, 1980; *New York Times*, Aug. 3, 1980.

⁹ *Congressional Quarterly Weekly Report*, Oct. 27, 1979, p. 2,396; Dec. 1, 1979, p. 2,726; Dec. 22, 1979, p. 2,881; Feb. 10, 1979, pp. 258-269; *Journal of Commerce*, Mar. 12, 1980.

¹⁰ *Congressional Quarterly Weekly Report*: Jan. 27, 1980, pp. 143-144; Aug. 11, 1979, pp. 1,661-1,666; Dec. 22, 1979, p. 2,881.

¹¹ *Washington Post*, Jan. 4, 1980; *New York Times*, Jan. 6, 1980; *Fargo-Moorhead Forum*, Jan. 8, 1980; *Baltimore Sun*, Jan. 9, 1980; *Wall Street Journal*, Apr. 7, 1980.

Issues for 1981 Legislation

Present concern about the effects of the trade suspension and rising costs of production on farm income will probably be carried over into consideration of 1981 food and agriculture legislation. It is unlikely that the basic shape of the agriculture act will change much in 1981, but debate on parts of it may be heated. If events of the past year are any guide, farmers will be looking for legislation that will protect them from future embargoes and more accurately adjust target and loan levels to reflect increased costs. They will also most likely seek support levels higher than those currently in effect.

During the presidential campaign, President Reagan promised to end the embargo, continue price supports with adjustments for the cost of production, and eliminate Federal estate taxes. John R. Block, the new Secretary of Agriculture, has additionally stressed the need to expand agricultural exports and cut back the Food Stamp Program. The Republicans may also want a different role for the farmer-held grain reserve and consumer interests within USDA. Other questions such as farm structure and conservation will likely arise during any farm bill debate. Certain farm groups and others interested in rural problems have recently expressed anxiety about the role of Federal policy in increasing farm size, corporate farming, and vertical integration. Secretary Bergland launched a series of regional meetings on the structure issue in March 1979 to obtain the views of farmers and other concerned groups and citizens as a background to preparing Department policy. Suggestions ranged from changing the tax and credit laws to limiting the amount of Federal payments to large farms. The structure meetings prodded a number of farm groups to take stands on the issue. Congress, too, has shown a willingness to look at farm structure (36; 26, pp. 1-4; 42). However, many farmers have a vested interest in current Federal programs and the new administration is not expected to press for change in this area. Environmentalists have been concerned for years about the increase in soil erosion resulting from expanded crop production in the seventies. An attempt to require farmers to comply with conservation practices in order to receive Government aid failed in 1977, but interest in it has continued. The President's Council on Environmental Quality in January 1979 proposed tying set-aside programs to conservation and pollution control. Several environmental groups have expressed a desire to put the same ideas in the new legislation. Any such proposals would almost certainly encounter opposition from farm groups. President Reagan has stated that he prefers voluntary rather than mandatory conservation measures (9, pp. 409-411)¹⁴

¹⁴ *Des Moines Register*: Jan. 26, 1979; Oct. 5, 1980; *New York Times*, Oct. 1, 1980.

Current Status of Agricultural Interest Groups

Farm Organizations

The 1980 suspension of trade against the Soviet Union brought the general farm organizations closer together, emotionally at least, than they had been for many years. Even though all major organizations called for some form of additional Government aid to counteract the embargo's effects, there is still much disagreement on specifics. The proposals have ranged from opening the grain reserves to all producers to drastically higher price supports. The National Farm Coalition, which represents the nearest thing to a consensus among farm groups, expects to be active in the debates on new farm legislation. However, the AFBF, AAM, and NFU have remained out of the coalition. Edward Andersen (Grange) became the coalition's new chairman at its May 1980 meeting. Charles Frazier (NFO) heads its steering committee. One factor that might bring greater unity among farm organizations is the appearance of new leadership. The NFO, AFBF, NFU, and Grange all replaced their top officials within the past year. It is still too early to determine whether this shift in leadership will mean more cooperation among farm groups. But, at least one new leader, National Farmers Organization's DeVon Woodland, has called for a new farm coalition along the lines of a labor union.¹⁵ If some sort of unity is not achieved, farm groups will likely have a harder time in Congress than they did in 1977.

The general farm organizations have not only had difficulty forming a united front, but their influence has also been impaired by a lack of internal cohesion. Both the Grange and Farm Bureau have many nonfarm members (about half by one estimate) whose views do not always agree with farmers. Many are rural business people who belong for professional reasons.¹⁶ Farmers themselves often join the general organizations because of services provided rather than organizational ideology. Many belong to more than one. The AFBF, NFU, and Grange all take stands on a wide range of political issues not related to agriculture and not necessarily supported by the whole membership. This tends to dilute their energies and causes Congress to regard them somewhat less seriously than the commodity groups, whose goals are more specific. It also gives them a partisan cast, whether deserved or not. The AFBF is generally perceived as conservative Republican and the NFU as liberal Democrat; these perceptions inevitably bias the way their agricultural views are interpreted.¹⁷ In

¹⁵ *Des Moines Register*, Dec. 14, 1979.

¹⁶ *New York Times*, Feb. 11, 1979.

¹⁷ Conservative is defined here as a small Government, free-market philosophy. Liberal is used to mean favoring a large Government role in the economy and society and relatively large Government expenditures.

addition, the broad programs of the general organizations create some tensions between their Washington lobbyists, who would like to concentrate on agriculture, and the home offices, which feel responsible to their memberships for other issues as well (5, pp. 111-116; 30, pp. 143-150; 21, pp. 117-120).

Farm Bureau

The American Farm Bureau Federation, founded in 1919, has been the most important major farm organization because it has the largest membership, 3.3 million families. With new members from the South, it is also one of the few general farm groups that is growing. It maintains the largest farm lobby in Washington. However, the AFBF's importance in policymaking has generally been less than its size would warrant. For one thing, its longtime commitment to free-market economics has run counter to most recent administrations. The Farm Bureau historically has taken conservative stands not only on farm issues but on many other questions. Its frequent agreement with the National Association of Manufacturers on labor issues has reduced its ability to attract urban support. In rating the House during the 95th Congress, five of the nine votes chosen for analysis by the AFBF dealt with labor. Furthermore, AFBF's diverse membership has often disagreed with the organization's official antigovernment aid philosophy. Due to pressure from the membership, the Farm Bureau has been advocating moderate Government programs intended to run until free-market prices reach adequate levels. Since the Soviet trade suspension, which it no longer supports, AFBF has looked more favorably on Government aid, supporting paid acreage diversion, loans and target prices for farmers not now in the program, increased CCC (Commodity Credit Corporation) export credits, and legislation to provide greater gasoline production. However, it remains the only general organization not demanding higher price and income supports.¹⁸

Farmers Union

The National Farmers Union, formed in 1902 and for a long time at the opposite end of the political spectrum from the Farm Bureau, views farm programs and other issues from a liberal perspective. A strong supporter of Government intervention in the economy, the NFU has often allied itself with labor and consumer groups. Its membership is located largely in the Plains States. The NFU usually asks for greater price and income supports than other farm groups. It has continued to favor parity over cost of production as a basis for supports. Agriculture Secretary Bergland's structure campaign began at the NFU's 1979 convention and the NFU has gone on record in favor of some payment and credit limits. Longtime presi-

dent Tony Dechant stepped down in March 1980 and was replaced by George W. Stone, who promised to continue the NFU's traditional policies. The embargo and credit crunch caused the NFU to escalate its demands. At its March 1980 convention, the organization backed a bill for substantially higher loan levels, emergency loans, and a producer-elected grain marketing board to handle all grain exports and imports. In June, the NFU urged President Carter to end the embargo. By September, it was proposing a major redirection of farm programs in the 1981 legislation, including reliance on loans and purchases rather than target prices to support farm income and automatic adjustments in loan levels to reflect cost increases. The NFU elaborated on its 1981 program at a convention in December, calling for cost of production estimates based on current land values, expansion of the farmer-held reserve, and guarantees that during future trade suspensions, support loans would rise to 90 percent of parity.¹⁹

Grange

The National Grange, the oldest existing general farm association (1867), occupies a political position somewhere between the AFBF and the NFU. Historically a social as well as a political organization, the Grange is less active in lobbying than most farm groups. Once centered in the Midwest, it now has a large proportion of its 460,000 members in the Northeast.²⁰ The Grange has continued to support the principles of the 1977 Act but backed a 7-percent increase in target prices in 1980 to offset higher production costs. After reluctant support of the embargo, it called for higher loan and target levels and a 10- to 15-percent grain diversion program. But it did not like the most expensive proposals before Congress. For the past 3 years, the Grange has been the most active among the major groups in urging reforms in agricultural programs, taxes, and credit to favor small family farms. Under its proposed Variable Deficiency Payment Program, Federal payments would decline with higher levels of production (41, pp. 28-32).²¹

National Farmers Organization

The National Farmers Organization has, since 1955, been an advocate of collective bargaining for agriculture in the manner

¹⁸ *Farm Bureau News*: Jan. 21, 1980; Nov. 3, 1980; Dec. 8, 1980; Farm Bureau press releases, Jan. 22, 24, 1980.

¹⁹ Reuben L. Johnson, "Statement on Public Policies Affecting American Agricultural Structure: Government Programs," National Farmers Union, Nov. 28, 1979; National Farmers Union press release, Nov. 27, 1979; National Farmers Union, *Washington Newsletter*: Jan. 11, 1980; June 20, 1980; Aug. 1, 1980; Sept. 15, 1980; Dec. 12, 1980; National Farmers Union press releases, Mar. 3, 5, 6, 1980; *Chicago Tribune*, Mar. 7, 1980.

²⁰ National Grange, "Statement by Edward Andersen," Structure of American Agriculture Meeting, Washington, D.C., May 1, 1980.

²¹ National Grange, "Statement by Robert M. Frederick," Nov. 27, 1979; National Grange press release, Jan. 10, 1980; National Grange, *View from the Hill*: July 29, 1980; Aug. 26, 1980.

of labor unions. The NFO has its own marketing programs for a membership estimated to be between 65,000 and 100,000. The NFO held products off the market several times during the fifties and sixties in an attempt to raise prices. With the resignation of founding president Oren Lee Staley in 1979, there are signs that the organization is making some changes in its image. The new president, DeVon Woodland, gave, for the first time, a public description of the NFO's secret marketing programs and indicated that they will operate on a sounder financial basis. After the Soviet trade suspension, the NFO urged strong action to preserve incomes, including Government purchase of 1979 grain directly from farmers at the prices prevailing 5 days before the suspension. The organization in February backed the same bill as the NFU before the Senate Agriculture Committee. The NFO has given more support than other farm groups to the new crop insurance program, in part because it does not run any insurance plans of its own. It has also expressed concern for the changing structure of American agriculture, favoring bills to change the tax laws to eliminate speculation and opposing corporate farming. For new farm legislation, the NFO favors a permanent rather than temporary farm bill and one that allows farmers to plan production and bargain without relying so much on Government supports.²²

American Agriculture Movement

The American Agriculture Movement, formed in late 1977, is the newest general farm organization. It has moved toward a more formal organization during the last year, with some States adopting bylaws and requiring dues. AAM adopted its first national slate of officers and elected Marvin Meek as national chairman in November 1979. While maintaining a Washington office, its most effective lobbying technique has been to bring masses of farmers to the Capital to confront legislators and USDA officials directly. These tactics had considerable success in 1978 but less in 1979 when AAM disruption of Washington traffic alienated many sympathizers. AAM has emphasized price support issues over the structure problem. Its most radical ideas, such as 100 percent of parity as a basis for farm programs (reduced to 90 percent in 1980) were rejected outright by lawmakers. But AAM has been able to dramatize the plight of farmers and to educate urban members about rural problems. The toned-down lobby of 1980 reflected a new approach by AAM: to work within the system. Instead of tractorcades, the farmers in February 1980 set up stills on the Mall near USDA and the U.S. Capitol Building to demonstrate the practicality of gasohol

production. AAM's rhetoric, though, remains the most severely anti-USDA.²³

Smaller Farm Groups

Several smaller general farm organizations also appear in Washington to testify at major hearings. The Midcontinent Farmers Association (MFA) is a group of 175,000 farmers headquartered in Columbia, Mo., which has favored high supports. After the Soviet grain export suspension, the MFA asked for high loan levels, a diversion program, and aid for alcohol fuels. Similarly, the much smaller Iowa-based U.S. Farmer's Association, organized in 1952, supported 90 percent of parity throughout the seventies. It has also determinedly opposed corporate farming and is friendlier than most farm groups to requiring cross compliance between conservation and price support programs. Two national women's farm organizations appeared in the last 5 years. Women Involved in Farm Economics (WIFE), an organization of about 2,000 in 15 States, has been calling for a national constitution for agriculture that would lessen the role of USDA and set up mechanisms for solving problems by regions. American Agri-Women, a federation of rural women's organizations with a somewhat larger membership than WIFE, has frequently attacked interference in agriculture by Government regulatory agencies (38, pp. 426-428, 595-602; 39, pp. 190-194, 203-208; 41, p. 57; 32, pp. 103-105; 34, pp. 87-97; 43, pp. 24-25).²⁴

Commodity Organizations

The general farm groups are complemented by a large number of commodity organizations representing specific crops. Their growth and expanding importance reflect the increasingly high specialization of American agriculture in the last 30 years. Although less well known than the general groups, commodity organizations are usually considered more effective lobbyists. Because they can concentrate their energies on a few issues, they have the sort of specialized knowledge that agriculture committee members need to formulate policy. Most of them enjoy a relatively homogeneous membership that enables them to take strong stands without many of the compromises inevitable in broadly based organizations. They are generally nonpartisan in outlook and can work well with members of both parties. Nevertheless, the willingness of

²² *Successful Farming in the South*: Jan. 1978, pp. 15-16, 30; May 1979, pp. 24-25; *Des Moines Register*: Dec. 16, 1979; Sept. 22, 1980; *NFO Reporter*, Feb. 1980; DeVon Woodland, "Statement . . . Before Bob Bergland," Structure of American Agriculture Meeting, Washington, D.C., May 1, 1980.

²³ *Washington Post*, Feb. 15, 1980; *Baltimore Sun*, Feb. 19, 1980; *Farm Times*, Aug. 5, 1980; Marvin Meek, "The 'Structural' Problem in Agriculture," Structure of American Agriculture Meeting, Washington, D.C., May 1, 1980.

²⁴ *U.S. Farm News*, Sept. 1980, pp. 1, 11, 12; Statements by Nita Gibson (WIFE) and Patricia Y. Zee (American Agri-Women) at the Structure of American Agriculture Meeting, Washington, D.C., Apr. 30, 1980.

many commodity groups to campaign locally for candidates who support their positions adds to their political clout.²⁵

Nearly every commodity is represented by at least one organization. In some cases, there are separate groups for producers, exporters, and processors. Wheat and feed grains are represented by several specialized groups. The National Association of Wheat Growers (NAWG) consists of wheat producers in 16 States. Its influence is undoubtedly enhanced because former Chairman Foley of the House Agriculture Committee was from a wheat-producing State. NAWG recently has been pushing for much higher target and loan levels, 85 and 70 percent of parity, respectively. It strongly opposed the 4-million-ton wheat reserve in the Food Security Act, although as a compromise, it went along in October with the bill to increase loan levels in the farmer-held reserve and establish an emergency foreign aid reserve. The U.S. Wheat Associates, formed in January 1980 by a merger of Great Plains Wheat, Inc., and Western Wheat Associates, is the export arm for wheat growers and concentrates on market development. The National Corn Growers Association, an organization of farmers, has asked for higher loans and a paid diversion program. The U.S. Feed Grains Council has a strong processor element. The Grain Sorghum Producers Association, in common with other grain producer groups, has asked for a paid set-aside equal to the amount of grain that would have been shipped to the Soviet Union. Also testifying before Congress at times on the grain program are processor groups such as the Independent Bakers Association and the American Bakers Association, both of which tend to oppose any measures that would increase prices (35: Feb. 27, pp. 12-15; Mar. 6, pp. 77-83; 40, pp. 21-26, 33; 41: Feb. 25, p. 54; Feb. 26, n. p.; 34: Apr. 29, pp. 57-60, 84-88; Apr. 30, pp. 48-53).²⁶

Several other national commodity groups have exerted considerable influence within their respective spheres. Dairy farmers, as a congressional report noted in 1973, are particularly "well-organized, well-financed, and politically astute."²⁷ No small part of their success has come from the fact that nearly every State has dairy farmers and they have contributed heavily to congressional campaigns. Their main organization, the National Milk Producers Federation (NMPF), has given effective support to cooperative marketing and dairy price supports. NMPF agrees with current programs but is concerned about the level of milk product imports, reconstituted milk, and antitrust investigations of cooperatives.²⁸

²⁵ *Congressional Record*, Apr. 12, 1973, p. 12,034 (Flannagan Report); *Des Moines Register*, Aug. 2, 1980.

²⁶ National Association of Wheat Growers, "Statement of Jack Felgenhauer . . . before . . . House Committee on Agriculture," Feb. 27, 1980; *Milling & Baking News*, Dec. 25, 1979, p. 58.

²⁷ *Congressional Record*, Apr. 12, 1973, p. 12,034.

²⁸ National Milk Producers Federation, "Agricultural Legislative Concerns—1981," Mar. 18, 1980; *Des Moines Register*, Sept. 20, 1980.

On the other side of the cooperatives issue is an organization of small milk dealers, the National Association for Milk Marketing Reform (NAMMR), which accuses the largest cooperatives of being monopolistic and undemocratic. However, the NAMMR and consumer groups that have attacked dairy cooperatives and the milk price support system have so far had little success. A move to lower an automatic October cost of production increase was scrapped in September (14, pp. 123-127).²⁹ Concurring with NMPF on cooperatives is the National Council of Farmer Cooperatives (NCFC), which represents about 90 percent of the Nation's farmer cooperatives. The council has strongly defended cooperatives against attacks on the special antitrust protection of the Capper-Volstead Act. The NCFC president in 1979 issued a warning about agriculture's deteriorating political power and called for much greater political action by cooperatives and other farm groups.³⁰

Another influential commodity group is the American Soybean Association (ASA). Unlike many other farm organizations, the ASA until recently opposed Government programs for soybeans except those dealing with market development. With a membership consisting of the most efficient mid-western soybean producers and processors, the ASA has emphasized competitive prices to develop export markets. In April, however, it came out for an increase in the soybean loan to \$5.02 to reflect higher production costs and the Soviet trade suspension. The ASA still opposes a soybean reserve, however. Less efficient producers in the South and elsewhere have opposed the ASA's free-market stand. Their requests for Government support are seen in the positions of some of the general farm groups. Soybean producers of all persuasions, along with the National Soybean Processors Association, strongly oppose embargoes or other political interference with exports. Livestock groups like the National Cattlemen's Association and the National Pork Producers Council have also been noted for their success in influencing Government policy, although livestock is not expected to be a major issue in upcoming legislative debates.³¹

Regional commodity associations have also been significant, especially in the South. The National Cotton Council, com-

²⁹ *Washington Star*, Feb. 20, 1980; *Washington Post*, Sept. 16, 1980.

³⁰ Kenneth D. Naden, "Statement . . . Before U.S. Department of Agriculture Hearings," Structure of American Agriculture Meeting, Washington, D.C., Apr. 29, 1980; *ibid.*, "Making the Farmer's Voice Heard in Washington," National Council of Farmer Cooperatives, Mar. 2, 1979.

³¹ American Soybean Association press release, Jan. 10, 1980; Allen Aves, "Testimony . . . on . . . Farm Structure Hearings," Structure of American Agriculture Meeting, Washington, D.C., Apr. 29, 1980; Sheldon J. Hauck, "International Trade Policy Issues Concerning Agriculture and the Economy," Structure of American Agriculture Meeting, Washington, D.C. Apr. 30, 1980; American Soybean Association, "Legislative Alert," Apr. 3, 1980; *Des Moines Register*, Aug. 2, 1980.

posed of both farmers and processors, has been successful in unifying the cotton industry and getting its views enacted despite the political decline of the South. Thanks to good prices and high export demand, cotton growers have not been asking for much Government help. The National Cotton Council supports the 1977 cotton provisions and has suggested a 10-percent cotton diversion program, but strongly opposes any payment limitations for large farms.³² Rice growers are not represented by a national association but instead work through State-level groups, including local Farm Bureaus. An ad hoc committee from five States is working on a common program for 1981. After the discord of 1975-76 when nonallotment growers won the right to grow rice, the issue this year will be whether to include nonallotment growers in loan and target price programs. It is not expected to be a major fight. Processors are represented by the Rice Millers Association. Peanut growers are also not well unified and they have had the additional problem of pressure from consumers and the administration to cut back peanut programs. Besides several State associations and active State Farm Bureaus, growers are loosely joined in the National Peanut Growers Group which has neither a national office nor paid staff. The National Peanut Council is a peanut promotion group counting both producers and processors in its membership. Growers were unhappy with an administration proposal to slightly increase peanut loan levels and they will be seeking higher supports. Recently higher peanut prices may dampen this effort, however.³³

Sugar planters have had the hardest time of all the southern groups since losing Government supports entirely in 1974. Once a well-concerted lobby with exceptionally good access to Congress, sugar in recent years has suffered from disunity and opposition from other powerful interests. Differences within the industry itself have made agreement on legislation difficult. Each segment has its own lobbying group and, in the case of cane sugar, producer groups are further divided into separate State organizations. Large Hawaiian planters oppose limits on payments to growers while the smaller planters on the continent went along with limits, in 1979 at least, as a necessary compromise. Corn sweetener advocates support high sugar prices to make their own product more attractive. Sugar producers want high prices but not at the expense of their competitive position. Producers generally favor tariffs over direct payments but refiners and industrial users prefer the latter so they can benefit from cheap imports. Labor usually supports the sugar bill in return for its labor provisions but turned against it in 1979. Consumer groups have strongly attacked the inflationary effect of high sugar prices and banded together in 1979 to form Consumers Against Sugar Hikes. So widespread has interest in sugar be-

come that, in 1978, the House began referring sugar bills jointly to the Agriculture and Ways and Means Committees. After the defeat of the 1979 sugar bill, no legislation appeared in 1980, but an effort will be made to include sugar in the new farm bill (9, pp. 193-198).³⁴

Consumer Organizations

Once not well organized, consumers now have many groups representing their interests in food and agricultural policy. These groups joined in 1977 to form a Coalition of National Consumer Organizations which at the time included the Consumer Federation of America, Community Nutrition Institute, Center for Science in the Public Interest, National Consumers Congress, and the Consumer Affairs Committee of the Americans for Democratic Action. Congress Watch and the National Consumers League have appeared since 1977. A similar coalition involving these groups can be expected in 1981. Because agriculture is only one of many consumer interests, consumer groups tend to use the Community Nutrition Institute as their main resource on agricultural issues. They wield little power before the agriculture committees but often receive a sympathetic hearing from Congress as a whole, especially when allied with labor unions.

Consumer organizations have recently shown much concern for agricultural policy. They are interested not only in the inflationary effects of high food prices but also food stamps, school lunches, direct farmer-to-market retailing, P.L. 480 programs, nutrition, and harmful chemicals in food. Consumer groups have often expressed sympathy for the problems of farmers, especially over the high cost of land and other inputs. At the same time, they worry that spending too much on farm programs might leave less money for consumer programs. Groups such as the Consumer Federation of America supported the high target prices of the Emergency Farm Bill in 1975 because they felt that insuring a decent income for farmers would guarantee an adequate supply of food. They generally went along with the 1977 farm bill, emphasizing the need for grain reserves but demurring at the use of cost of production data to determine income supports. They favored the wheat and feed grains sections of the bill, but opposed expensive programs for peanuts and sugar (37, vol. 1, pp. 885-897).

Since the grain suspension, consumer groups have questioned the need for large increases in price and income supports because market prices have not declined much. Furthermore, because of inflation there should be even more opposition to high supports for smaller crops, especially sugar. The Consumer Nutrition Institute this year is making a big issue of reconstituted milk and high dairy supports, which puts it in

³² National Cotton Council of America, "1980 Resolutions."

³³ *Washington Agricultural Record*, Feb. 1, 8, 1980; *Wall Street Journal*, Oct. 15, 1980.

³⁴ *Atlanta Constitution*, Mar. 26, 1980; *New York Times*, Feb. 25, 1980.

opposition to milk producers. It is being joined in the dairy fight by Common Cause and restaurant chains. Consumer organizations still want to broaden USDA's mission further in the areas of nutrition and consumer affairs and change its name to the Department of Food and Agriculture. They have also shown considerable sympathy toward protecting small- and medium-sized family farms (12).³⁵ As usual, farmers will depend on an alliance with consumers to pass a farm bill. In a year when farmers will be making major demands but consumer awareness of food prices will also be running high, the position of consumer organizations could be significant.

Other Organizations Interested in Agriculture

Other organizations have also taken stands on agricultural issues (28). The National Conference of State Legislatures' Rural Development Committee has supported measures to protect family farms and urged USDA to better coordinate commodity programs with rural development. The National Governors Association formed a Committee on Agriculture in early 1980 and has hired an economist to draft a proposal for a new farm bill. The National Governors Association will probably emphasize the structure issue.³⁶ The AFL-CIO enjoys a close relationship with the NFU and is critical of the involvement of big business in agriculture. It also maintains that "federal farm programs should encourage maximum production to help hold down food prices for U.S. consumers."³⁷ The U.S. Chamber of Commerce, on the other hand, supports the free entry by agribusiness into agricultural production and opposes high price supports.³⁸

Several groups have concerned themselves with nutrition, humanitarian aid, rural development, and the structure of American agriculture. The Freedom from Hunger Foundation has emphasized adequate nutrition for the poor through food stamps, school lunches, and other Government and private aid programs. The United States Catholic Conference and the National Catholic Rural Life Conference have shown much interest in preserving the family farm. Along with the Friends Committee on National Legislation and the Interreligious Task Force on U.S. Food Policy, they have proposed changes in price-support programs that would base payments on family income and exclude corporations from receiving Federal money. Rural America, founded in 1975, is involved

with many issues related to the quality of rural life, including housing, jobs, health, reclamation, and small farms. It speaks for a number of small farm advocacy groups and has criticized USDA for being too sympathetic to large farmers and agribusiness. The National Family Farm Coalition (1978) contains farm, consumer, environmental, energy, and labor groups. It has been supporting the proposed Family Farm Development Act which would reorient USDA policies to help small family farms.

In California, the battle over whether to limit irrigated farms to 160 acres has spawned organizations on both sides, including National Land for People (for) and the Farm Water Alliance (against). Conservation groups with an interest in linking Government support programs to compliance with conservation practices include the National Association of Conservation Districts, Natural Resources Defense Council, Environmental Policy Center, and Environmental Defense Fund. Regional organic farming groups, which have become more politically active in the last few years, have also shown an interest in cross compliance. Organic groups recommend the use of renewable resources and the conservation of energy through organic farming methods and local distribution of food.³⁹

Conclusion

The new food and agriculture bill will probably bring to Washington a more diversified collection of interest groups than any farm bill of the past. In a year when economic conditions are making farmers want more from long-established programs, other interests are asking for substantial changes in those programs. If farmers agree on a common policy and nonagricultural interests stay in the background, the new law could turn out to be a slight modification of the 1977 Act. But if farm organizations sharply disagree and other forces press for change, the new law could represent a significant departure from previous ones. The final legislation will reveal much about the relative power of farmers in an urban society.

³⁵ *Baltimore Sun*, Feb. 24, 1980; *Wall Street Journal*, Oct. 16, 1980.

³⁶ Dale Locker, "Statement . . . on the Structure of American Agriculture and Rural Communities," (National Conference of State Legislatures), Structure of American Agriculture Meeting, Washington, D.C., Apr. 30, 1980.

³⁷ AFL-CIO, "Policy Resolutions," Dec. 1979; Thomas R. Donahue, "Speech before the National Farmers Union," Mar. 6, 1980.

³⁸ Clarence D. Palmby, "Statement of the Chamber of Commerce of the United States on the Structure of American Agriculture," Structure of American Agriculture Meeting, Washington, D.C., Apr. 30, 1980.

³⁹ Freedom from Hunger Foundation, "Meals for Millions," 1979; United States Catholic Conference, "The Family Farm," 1979; Friends Committee on National Legislation, "The Family Farm Basic Income Act of 1979: Draft-Outline," Mar. 28, 1979; Interreligious Task Force on U.S. Food Policy, "Interfaith Statement on Public Policy and the Structure of U.S. Agriculture," Structure of American Agriculture Meeting, Washington, D.C., Apr. 30, 1980; Rural America, "Rural America Now," June 1979; Robin Rosenbluth, "Statement for the National Structure of Agriculture Hearings," Structure of American Agriculture Meeting, Washington, D.C., Apr. 30, 1980; Robert Rodale, "The Structure of Agriculture as it Impacts on Conservation, Resource Use and the Environment," Structure of American Agriculture Meeting, Washington, D.C., Apr. 30, 1980.

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In addition to the above sources, this article is based on interviews with lobbyists from most of the major farm associations and congressional staff.

Global Prospects

Changes in the Farm Sector

Inflation

Capacity for Greater Production

Transportation

Trade Issues

Commodity Programs

Policy Setting

A Policy Approach

Food and Agricultural Policy: A Suggested Approach

John E. Lee *

Much has been said about the need for an explicit food and agricultural policy for the United States. This paper provides a point of departure for thinking about the meaning, content, and implications of such a policy.

This Nation has a long history of policies and programs regarding agriculture, rural people, natural resources and, more recently, food aid and nutrition. Implicit in each of these are some assumptions and perceptions about food supply and distribution; in that sense there have long been implicit food policies. Indeed, policy officials have pointed to abundant food supplies, an efficient agriculture, and low food costs as proof that a food policy exists and works well.

There are, however, increasing signs that a food and agricultural policy that is essentially the cumulative byproduct of other policies may be inadequate for the future. Reasons cited for concern and for the need to reevaluate the objectives of current policies include:

- The fragmentary character of myriad agricultural and food-related policies which have evolved over time to address specific problems.
- The emerging awareness of unexpected side effects and long-term impacts of individual policies or programs and interactions among programs.
- Inconsistencies in objectives and consequences among existing policies and programs.
- The changing structure and fundamental character of American agriculture, which raise questions about the validity of policies formulated in an earlier era.
- The emerging awareness that our resources are limited and that tradeoffs among policy objectives are necessary.
- The growing global interdependence between our agriculture and the rest of the world.

- The impacts of changing availability and prices of energy and of efforts to have agriculture become an energy producer itself.
- The broadening of the constituency of food and agricultural policies and the concerns these new constituents put on the policy agenda.
- The need for an orderly framework for sorting out the above forces.

Let us examine these reasons in more detail.

The fragmentary nature of the array of food-related policies and programs managed by the U.S. Department of Agriculture (USDA) and other Government agencies is a natural consequence of attempts by the body politic to respond to problems and constituent needs over a long period of time. Since the problems and needs arose (or were perceived) separately and at various times, there was no context for thinking of the individual policy responses as components of a broader fabric. As a result, this country's food-related policies and programs are a maze of legislative authorities administered by numerous agencies and bureaucratic entities, each having its own perception of mission and purpose which is generally not seen as related to any broader concept of food policy.

Many of USDA's current major programs had their roots in the twenties and thirties, when there were over 6 million farms, mostly small and mostly poor. Agriculture was considered "disadvantaged" relative to much of society. Farmers were considered high-risk borrowers, so capital was limited and expensive. Overproduction, depressed prices, and depressed incomes appeared chronic. Except in wartime, a plentiful food supply was not a major policy concern. Thus, policies were initiated to address the perceived problems: to make credit available at competitive or low costs, to reduce the inherent risk in farming through crop insurance and price stabilization, and to enhance income through price supports and other means.

The old perceptions persisted while agriculture and the food system underwent a fundamental change—industrialization.

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As in other sectors of the economy, that change was characterized by specialization, not only in commodities produced but also by nonfarmers doing things formerly done by the farm operator. For example, most farms once provided their own horsepower, fuel, seed, supplies, and raw materials. With specialization and new technology came economies of size and greater returns for innovators. Total production increased rapidly and a cost-price squeeze ensued which spurred traditional farmers to adopt the demonstrated technologies and the innovators to seek new economies. In the process of adjusting to these changes, whole commodity subsectors reorganized and, in some cases, relocated. Beef fattening and broiler production are prime examples. Financing this technology-induced revolution in farming was made possible by risk-reducing public price and income programs and innovations in credit institutions.

The result of these changes is an agriculture—and a food system—fundamentally different in character and needs from that of the thirties. The trends in the farm sector, trends which are projected to continue, are clearly toward:

- A rather small number of large-farm operators who produce most of the agricultural products, have incomes better than the average American, and receive most of the benefits of price and income support programs.
- A much larger number of persons who operate small farms, produce little of the total value of agricultural output, and are only tangentially affected by traditional agricultural policies. The group includes some who are full-time farmers and genuinely poor, but a larger number whose incomes come primarily from nonfarm sources and exceed the median incomes for the average American.
- A group who operates intermediate-size farms. Some of these producers depend primarily on farming for a living and are reasonably efficient but are not large enough to have adequate incomes. This intermediate group of producers is declining in number and in their share of farm output.

The growing awareness of the changed character of agriculture has given rise to questions about the intended purposes and benefits of long-established farm policies.

Furthermore, it is increasingly apparent that some individual programs designed to achieve a particular objective or solve a specific problem have side effects or long-term impacts not intended or envisioned by those who originated and supported them. For example, commodity price support programs had the stated objective of enhancing incomes of farm operator families. To some extent, they achieved that objective. But we have also found that a high proportion of the benefits of those programs were capitalized into higher land

values, thereby benefiting landowners. Operators who were not landowners did not share fully in those benefits. The higher land values increased the difficulty of entry by new operators, increased the costs of food production, increased the debt capital required to maintain ownership, and, consequently, reduced the resiliency of heavily indebted land purchasers to income fluctuations.

Similarly, we now see that credit programs may have contributed to inflation in land prices, tax policies may have reinforced the trend to fewer and larger farmers, and even research policies, while neutral in intent, may have benefited some groups of purchasers over others and encouraged structural change.

Given the diverse origins and objectives of food and agricultural policies and programs and their often unintended and not well understood impacts, it is not surprising that there are inconsistencies and conflicts among them. Some programs subsidize land drainage and expand irrigation, thus adding to the capacity of the production sector; others restrict production or take supplies off the market because of overproduction. At other times, calls for expanded production undo years of effort to conserve land and water resources.

One of the most significant recent developments for the food system has been the phenomenal growth in U.S. agricultural exports, which has deepened the interdependence between our economy and the world marketplace. Foreign food demand has continued to outpace supply, making food-importing countries increasingly dependent on the United States as the residual supplier. We, in turn, depend on exports as a major market for farm products. Consequently, a major crop shortfall or supply disruption anywhere in the world can reverberate quickly through international trade to the U.S. food system.

The phenomenal growth in exports of U.S. farm products has at least two implications of critical importance to domestic food policy. The first is that while exports mean expanded markets and stronger prices and incomes for U.S. farmers, our role as a major international supplier of food carries with it certain responsibilities and implies certain constraints on domestic food policy. If we are to maintain our credibility in world markets, we have to be able to assure dependable supplies. Moreover, total U.S. agricultural trade, as large as it is, is still a very small part of total world production and consumption. Variations in production in the rest of the world, therefore, can cause disproportionately large fluctuations in our trade. For that reason, we have to develop domestic policies (such as the grain reserve and price floors) which protect both U.S. farmers and consumers from the resulting price gyrations. We also have to be cognizant of how our domestic farm price, production, and marketing policies affect our competitive position in the world market.

The other and perhaps more significant long-term consequence is that strong world demand has essentially taken the slack out of the U.S. production system. There have been relatively few constraints on U.S. production in recent years. Since most of our cropland is now in production (including that idled earlier by Federal farm programs), higher crop prices will be needed to bring sufficient additional land into production to meet the expected growth in world demand for food. While we will still have to deal with excess production in some years, we have probably reached the end of the long adjustment to chronic overproduction and depressed prices that characterized U.S. agriculture for most of this century.

This situation poses a host of new issues and questions less familiar to policymakers than the issues with which we have grappled for the past 60 years. As higher commodity prices draw production from more marginal lands, productivity will fall, and land prices will rise. If the marginal acres brought into production are ecologically fragile, there will likely be increased concerns over soil erosion, water pollution, and other forms of environmental degradation, not to mention loss of future productive capacity. Who should capture the benefits of sharply higher land prices as farm prices rise to attract additional marginal acres? The most basic issue, however is whether domestic food policies designed to cope with overproduction and depressed prices are adequate for the coming era of relative scarcity.

The world energy shortage, which emerged in the seventies, will also have significant long-term consequences for the U.S. food system. The most important consequences may not be the obvious ones. Direct use of petroleum fuel products in the farm sector is a relatively small part (3 to 4 percent) of total U.S. use. The costs of petroleum products are also a relatively small part of total farm production costs, but their use, and therefore costs, are not evenly distributed among types of agriculture. Fuel costs are small relative to the value of dryland wheat or midwestern corn or soybeans, for example, but quite large for intensively irrigated crops. As a result, sharply rising fuel costs will impact on the mix of products produced as well as on the location of production. Also, much of the growth in yields and production capacity of the farm sector has come from a technology built, at least in part, on heavy use of cheap fuel and cheap chemical products (especially fertilizers and pesticides), largely derived from petroleum. If rising energy prices imply rising real prices of pesticides and fertilizers, the productivity of American agriculture could be adversely affected at a time when increased production and productivity are needed.

It is possible that the most significant energy issue in U.S. agriculture will be the role of agriculture and agricultural resources for the production of energy. If, in addition to strong demands on the agricultural resource base to produce crops for exports, there are sufficient economic incentives for

rapid growth in the production of biomass for alcohol fuels, there could be significant competition between food and fuel. Research is underway to determine the impacts that such a situation might have on farm product prices, food prices, location and mix of agricultural production, land and water use, export prices and volumes, and marketing institutions.

The natural constituency of food policy has broadened greatly due to a variety of domestic and international developments. These developments include: the growing ineffectiveness of fragmentary approaches to food policy and concern over unintended side effects of such approaches; the changing structure of the farm production sector along with growing concentration in other stages of the U.S. food system; the growing interdependence of U.S. agriculture with the rest of the economy and with the international economy; the end of a long era of adjustment to excess supply and depressed prices; the emergence of concerns about the stewardship of our land and water resources; and the unclear implications of the emerging energy situation.

Over the years, public policy has tried to respond to specific food and agricultural issues as they have arisen. Many of those responses are now embodied in ongoing programs of USDA. Thus we have income-enhancing programs to meet welfare objectives, price programs to reduce disruptive variability and to enhance allocative efficiency, credit programs ostensibly to offset imperfections in money markets, scientific research programs to deal with diseases and pests and to improve productivity, and inspection services to protect consumers' health, to name a few. These programs have been supplemented, amended, and patched up as farmers' needs have changed and as new problems and issues have arisen. The accumulated bits and pieces of legislation, policies, and programs constitute, in the aggregate, a jerrybuilt food policy. But considering the broadened concerns about the performance of our food system, the goals of this cumulative food policy need to be reevaluated and a more orderly framework developed for resolving conflicts and priorities.

A Concept of "Food Policy"

Essentially, the development of a comprehensive, integrated food and agricultural policy (hereafter referred to as a "food policy") means recognizing that a broad array of food, agricultural, and resource goals are all interrelated and must be treated within a common policy framework and process if their interactions are to be effectively considered. By definition, such a food policy would include all policies and programs that provide the economic, technical, and institutional framework within which the food and fiber industry serves the public interest. It would be broader and more inclusive than traditional farm commodity policy. Its overall objective would be to give the component policies and programs a

unifying direction and meaning. That unifying objective is determined by addressing the question, "What is the ultimate purpose to be achieved and for whom?" The answer to that question will establish the character of a national food policy.

A deliberate food policy could be expressed in terms of a hierarchy of goals, all subsidiary to an overall objective. There would likely be situations where two or more of these goals would conflict, that is, where maximizing one goal would have an adverse impact on other goals. Herein lies an important potential value of a food policy with a specific hierarchy of goals: the conflicts and tradeoffs among goals could be identified and estimated and programs managed in a way to minimize conflicts and maximize complementarities. Even if priorities among goals are not clearly established, at least the tradeoffs would be known and could be dealt with in an open and rational process. For example, if certain environmental or structural objectives could be achieved only at the expense of higher food costs and if good estimates of the tradeoffs involved could be provided, the final choice would be a more informed decision and could be based on more thorough debate.

A food policy would not supersede all the old programs, although it might lead to a new allocation of resources among them. Most existing USDA programs, for example, would be integral parts of a food policy. But the difference would be that an articulated food policy would give all existing programs a new and clearer sense of direction. It could also mean a new hierarchy of priorities within some programs, leading to changes in budgets and activities.

Thus, conservation programs would be more clearly seen not only as ends unto themselves but as means of assuring land and water resources to provide food for future generations. Agricultural research programs could meet the objectives of a food policy not only by improving the productivity of land and water resources but also by providing technology which enhances structural, environmental, and nutritional objectives. Food distribution programs could support the goal of assuring the availability of nutritious food to all income groups. Extension education programs could support a whole range of society's food-related goals—from efficient farm production to more nutritionally informed consumers.

While a food policy could be a central integrating thrust of USDA, there could also be other thrusts whose interaction would be consistent with, but broader than, the food policy. For example, a "resources policy" would certainly be a key component of food policy (fig. 1). But there could be other resource policy objectives such as aesthetic values, access to open space, preservation of wildlife, and recreation. Likewise, elements of trade policy are essential to an effective food policy. In figure 1, the area of overlap of the three

policy circles represents interests of mutual concern. For example, excessive exports could cause soil erosion and deterioration of the resource base and thus pose a threat to future capacity to produce food. A food policy provides a process and a framework for evaluating tradeoffs between food policy objectives and objectives of other policies.

Implementing a deliberate and comprehensive food policy might include at least these component steps:

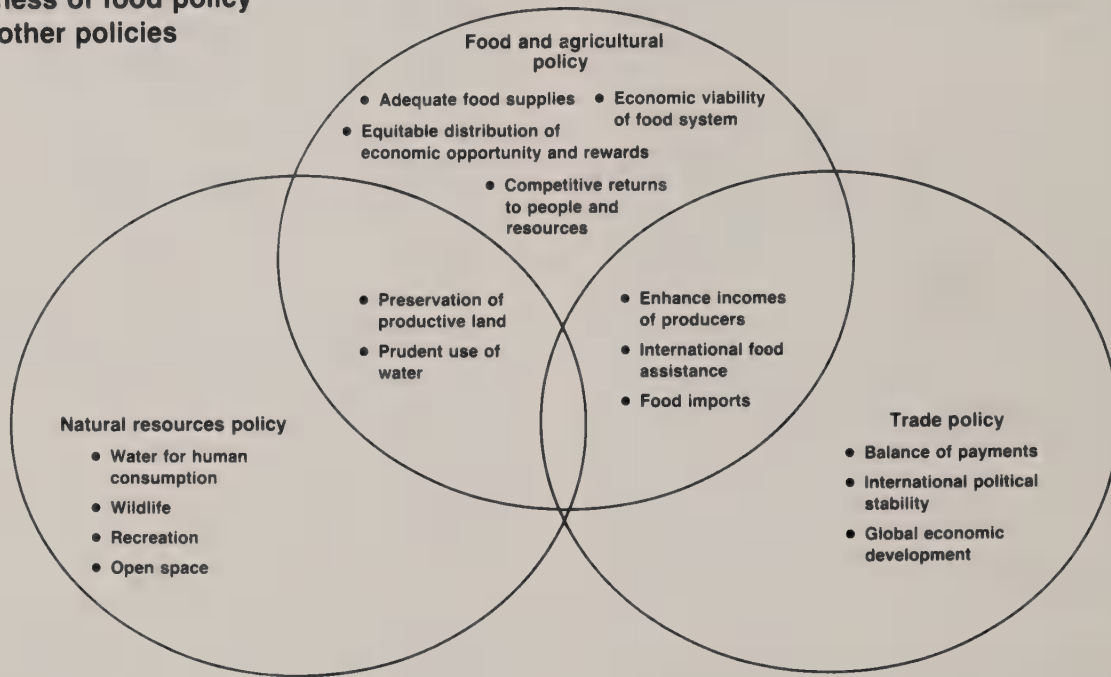
- Agreement on the basic objective or purpose.
- Identification of specific additional and subsidiary goals which collectively define the policy content.
- Establishment of relative priorities or criteria for priorities among goals.
- Development and management of programs to realize the goals.

Establishing priorities or criteria for priorities among food policy goals is important. We have a growing number of single-issue constituent groups, each viewing its issue as all-important. The food policy arena is packed with farm price and income constituent groups, conservationists, environmentalists, "structure" groups, nutritionists, the farm labor lobby, land reformers, consumerists, and others. As these groups grow more articulate, and as farmers seek to protect their traditional interests, the potential for conflict in setting food policies clearly exists. Either priorities must be established through an orderly, institutionalized process and be strongly supported by the political process or else the effectiveness of a deliberate, multigoal food policy will be blunted, if not thwarted altogether.

Establishing priorities is not an easy task. Moreover, it is not likely that a simple ranking of priorities would prove sufficient to resolve conflicts among food policy goals. Frequently the tradeoffs among goals will be matters of degree rather than a case of achieving one goal versus another. For example, a goal of adequate food supplies may be given higher priority than assuring equitable distribution of economic benefits. But if the situation were such that great strides in the latter goal could be made with only minor increases in risk to the food supply, the progress in equity could be judged by the body politic to be worth the cost of reduced assurance of adequate food supplies. Thus, what is likely to be a more practical process is to establish only general priorities through legislation and leave the resolution of tradeoffs to key program administrators and policy officials. Major tradeoffs, and even minor ones perceived to have symbolic significance, could be referred back to the legislative process for resolution.

Figure 1

Interrelatedness of food policy to selected other policies



Goals are just goals until programs are developed and adopted to achieve the goals. Many of the programs necessary to support a comprehensive food policy already exist (and will be noted later in this article), but an explicit food policy might clarify their roles. For some long-established programs, new identification of a significant role in a food policy could bring revitalization and new sense of purpose.

Most importantly, the fragmentation and inconsistency that has often characterized past food and agricultural programs would be reduced. If programs were operated in the context of clearly established goals and priorities, their effectiveness could be better judged by policymakers and by the American people. A food policy context would also provide program managers with a broader perspective. The story is told of three stonemasons who were asked what they were doing. The first replied, "I am laying a stone." The second replied, "I am building a wall." The third, being a person of vision and purpose, replied, "I am building a cathedral." Perhaps a clearly articulated and well understood food policy could help program managers see how the stones they lay and the walls they build are contributing to the larger cathedral—to a sound and productive food system and to the nutritional well-being of people here and abroad, present and future.

We turn next to a more specific identification of possible goals for a national food policy, the rationale for those goals, and the arrangement of those goals in a hierarchy.

Food Policy Goals and Priorities

A comprehensive food policy would not necessarily introduce new goals, but rather organizes existing ones. The essential goals for a food policy have been articulated already. They are the many objectives and concerns expressed over time by a variety of constituencies and interest groups. Creation of a deliberate food policy would require sorting through those concerns, determining which would belong in the context of a food policy versus some other more appropriate policy area, and then recasting those concerns as goals in the context of a consistent, orderly, and comprehensive food policy.

Furthermore, the articulation of a food policy would provide an opportunity to reevaluate and restate the mission and goals of USDA and to identify clearly its responsibilities in regard to a national food policy. If there are potential conflicts and complementarities with other departments and agencies, the sorting out of a food policy should reveal what

those relationships should be and how they should be managed. The process could also reveal legislative issues that need to be addressed.

Expressed Goals and Concerns

A list of concerns to be considered in a food policy context can be compiled from several sources. The various legislative and administrative documents underlying agricultural and food programs, existing or proposed, contain explicit and implicit statements of concern, purpose, and objectives. Our history of agricultural development and policies and the accompanying political rhetoric provide a historical set of goals and concerns which the Congress has sought to address. A host of special interest groups have added their concerns to the agenda. Finally, the perspective of the changing domestic structure of agriculture and its international context (as summarized earlier in this article and described more fully in the first two articles in this issue) suggest additional concerns that must be addressed by future food and agricultural policies.

From all those sources, I selected a list of concerns for consideration as components of a national food policy. The list is neither perfect nor complete, nor will all agree that every item on any list should be included as policy goals. But this list probably captures the essential food policy concerns. Unanimity of opinion, moreover, on the appropriateness of a specific goal is not a prerequisite for consideration of that goal in the policy process.

There is no particular reason for the order of items in the list. The list begins with those concerns traditionally expressed by agricultural producer interests, proceeds to those that tend to be expressed by the consuming public, then picks up concerns expressed by a variety of public and private interests. There is no attempt to completely eliminate duplication or overlap. Indeed, it will be seen that the complex interrelationships among these concerns make elimination of overlap impossible.

- **Adequate Producer Income and Returns**—For more than 50 years, one of the principal objectives of Federal agricultural policy has been to protect and enhance income to farmers and returns to their resources. This goal was deemed important because farmers appeared disadvantaged relative to the rest of society—improving their status was a matter of equity and fairness. Maintaining reasonably competitive returns to resources committed to farming was also seen as necessary to assure continued investment in farming and adequate supplies of food and fiber for the future. In addition, agricultural interests have long enjoyed greater political influence than the numbers of farmers would suggest. Today, for a variety of reasons, the political clout of the farm bloc has somewhat diminished. The perspective on returns to farm

producers and their families has changed as the structure of agriculture has gradually evolved. A relatively small number of large farmers produce most of our farm output and receive incomes that are higher than most nonfarm families; those farmers also generate resource returns that are generally competitive with those earned in the nonfarm sector. Most smaller producers have more nonfarm income than farm income, and as a group fare reasonably well. Between these groups are the full-time family farms with little or no off-farm income and whose net income from farming is not large. These farms are declining in number and share of production but are still important clients of farm price and income policies.

Maintaining the attractiveness of farming as an occupation and as a source of competitive returns to investments and resources will continue to be an important goal of farm and food policy. However, future income policy may differ from past policy in at least two respects: increased concern with how the returns are distributed among farmers and resource owners; and increased consideration of the relationships and tradeoffs between farm income goals and other food policy goals.

- **Reduction of Producer Risk and Uncertainty**—Agriculture was once considered a high risk sector of the economy. Partly for that reason, credit was difficult to obtain and agricultural resources were not used as efficiently as possible. Over the years, producers and their organizations have strongly supported programs that provide price and income stability and insure against natural and economic disaster. Today, while agriculture is still subject to the vagaries of weather, the economic risks are probably not greatly different from those for other businesses.

Even during periods of adverse weather and low farm commodity prices, the failure rate of farm businesses does not exceed that for nonfarm businesses. Nevertheless, some public sharing of farmers' risks, partly to assure orderly and efficient resource use and partly to achieve structural objectives, will likely continue to be an important concern of food policy.

- **Managerial Freedom**—Farmers have always expressed strong support for policies that leave them as much decision flexibility and managerial freedom as possible. From a societal point of view, such policies have merit because managerial decision freedom is seen as leading to the most efficient use of resources. However, farmers have frequently shown a willingness to compromise on this goal in order to achieve other goals such as price stability, orderly marketing, and higher prices and incomes.
- **Access to Market Information**—Just as consumers have expressed the need for adequate information to make

informed purchase and consumption decisions, farmers have supported public programs that give them access to accurate and timely information on commodity markets and prospects for supply, demand, and prices. Such programs are seen as improving efficiency in farming and agribusiness and as enhancing the workings of private competitive markets. Future support for such programs is likely to be mixed with concern for the accuracy and usefulness of information in the context of rapidly changing market structure. Nevertheless, there is strong demand for improved market and outlook information. Providing such information would be widely supported as a legitimate goal of national food policy.

- **Competitive Markets for Farm Products**—Farmers have long been concerned about access to open and competitive markets for their products. In recent years, there has been growing concern about the decline in competitive pricing in some commodity markets, increased “formula” and contract pricing, and the decline in numbers of buyers and in competitive auction-type markets, especially for livestock products. Similar concerns exist about developments in markets for farm supplies.

Some producers might restate the goal as one of redressing the balance in market power between farmers and those from whom they buy and to whom they sell. This goal might be achieved by assuring that all markets are open and competitive or by developing institutions that assure producers equitable bargaining power. From a societal perspective, it is important that a balance of market power be achieved in a way consonant with efficient resource use and consistent with achieving other important societal goals.

- **Fair Market Practices**—Over the years, farmers have supported policies and programs designed to assure fair market practices. Such practices include honest measures and weights, truthful labeling and product information, and honest pricing practices. Such practices are also in the public interest in that they support efficient production and marketing and reduce risk and uncertainty.
- **Security of Food Supply**—As a Nation blessed with abundant resources, the United States usually has been concerned with having enough food only in times of war. Even then, the concern has been modest relative to that in nearly all other societies, where adequate food supplies have been less certain. However, a number of indirect or longer term concerns have been expressed which imply food security as an important goal. Because food has been in abundant supply in the past does not automatically mean that it will be in the future, especially if abundance is expressed in the context of relatively low real prices. If global demands on the United States as a residual supplier of food continue to grow, the traditional abundance at low prices could be jeopardized.

Thus, policies to assure adequate food supplies could become of more immediate or practical concern before the end of this century.

In this context it is also important to define food security for whom. Should we, as a matter of policy, accept some responsibility for global food security? If so, should this be a goal of our national food policy or of our foreign policy?

Security of food supply has been expressed as a policy objective in other ways. Concern about growing foreign ownership of U.S. farmland and efforts to limit that growth are sometimes cast in terms of a potential threat to domestic food supplies which could result from “alien” control of agricultural production. Some concern has likewise been expressed that the private grain exporters, many of them owned and managed by multinational parent firms, might seek to maximize earnings by continuing to export even when doing so could disrupt the domestic livestock industry and sharply increase domestic food prices by creating shortages.

The food security issue also concerns the growth of concentration in economic power in food manufacturing and distribution and the potential for creation of artificial shortages. Finally, many traditional agricultural programs have been justified in terms of food security. Farm price and income policies have been supported in part to assure a viable farm sector and thus the supply of food. (This has been an important element in the Common Agricultural Policy of the European Economic Community.) Soil and water conservation programs have been justified as protecting future production capacity, as have agricultural research policies and public credit programs. These are but a few of the explicit and implicit expressions of food security as a basic concern of food policy.

- **Reasonable Food Prices**—This is one of the most often expressed but least well-defined concerns. However defined, most would agree that a desirable food policy is one that assures an adequate diet within the economic means of most Americans. “Reasonable” food prices also would most likely be understood as costing a small enough share of disposable income to permit people to meet other basic needs, such as shelter, clothing, and transportation, and to pursue secondary personal objectives. In practice, determining what is reasonable in terms of food prices and income shares going to food is partly a function of the abundance and productivity of the Nation’s resources and partly a function of the political process, since policy tradeoffs are involved.

Despite these definitional difficulties, a food policy that does not address the level and stability of food prices is not likely to be acceptable.

- **Safe, Wholesome, and Nutritious Food**—While many specific food safety and nutritional issues are still highly controversial (for example, should meat products containing nitrite preservatives be sold? What constitutes desirable diet?), there appears to be widespread support for the notion that the food we eat should be safe and wholesome and that assuring such safety is a legitimate public policy objective, and also that nutritionally sound eating habits should be encouraged in the operation of Federal food programs.

- **Consumer Information**—Demand appears to be growing for information that enables consumers to make better informed choices regarding nutrition, health, and economic value when buying food. Again, however, the specifics may be controversial (for example, how to inform consumers that products containing mechanically deboned meat have a higher calcium content).

Moreover, there will likely continue to be differences of opinion regarding the appropriate roles of Government and private industry for providing consumer information. But, the increased incidence of nutrition labeling, unit pricing, net weight and dry weight labeling, and legal actions to enforce truth in advertising attest to the legitimacy of improved consumer information as a public concern.

- **Food Variety and Choice**—National survival does not require a wide range in the variety and choice of foods readily available to all. However, Americans are accustomed to having a rich assortment of foods before them, and would likely consider maintaining and enhancing that variety as highly desirable.
- **Efficient Use of Resources**—From a societal perspective it is important that any economic system use resources efficiently. Such efficiency holds down costs and conserves limited resources, thus assuring longer term food security. Despite having a relative abundance of good land and other productive resources, Americans are coming to realize that those resources are not limitless and that costs are likely to rise rapidly as the limits are pressed. The inefficient use of land and water resources has implications for future productive capacity, loss of resources for other uses, and the quality of the environment. Inefficient use of energy worsens the national balance of trade and increases vulnerability to disruptions in foreign oil supplies.

Efficiency in the food system includes both pricing (marketing) efficiency and technical (production) efficiency. Marketing efficiency assures that appropriate price signals are transmitted to those who manage production processes and allocate resources. Technological efficiency assures the best use of resources for producing a given level of output or getting the most output from a given level of resources. Thus, efficiency in the food system is affected by production and marketing institutions as well as by available technology.

Whether or not a goal of efficiency is consistent with other goals of a food policy is problematical and subject to how efficiency is defined. For example, certain organizational and structural implications (such as fewer and larger farms) may be implied from maximizing efficiency when the state of technology is given. But it must be remembered, technology too is variable and subject to resource allocations and research and development priorities (meaning, among other things, that research might also help to improve the efficiency of small farms).

Whatever the tradeoffs between high levels of efficiency and other food policy goals, it is clear that efficiency through the food system is an important goal, since serious inefficiency would be a threat to future food supplies and would certainly increase food costs.

- **Conservation of Resources**—The need to conserve resources partly overlaps the goal of efficiency but often is expressed as a separate concern. In the context of food policy, most attention is given to conserving land and water resources and, more recently, energy. Conservation of resources is seen as essential for protecting future capacity to produce food (food security) and for protecting the quality of the environment.

Traditionally, those most vocal about the need to conserve soil and water have constituted a special interest constituency for the Congress and USDA. That constituency sometimes has been in agreement and sometimes in conflict with the traditional commodity policy constituency. But, as policy concern shifts from dealing with surpluses to dealing with growing demand and limited land and water resources, resource conservation and use policies will become of central importance to farm and food policy.

- **Environmental Quality**—Farmers and businesspeople in the food system have sometimes viewed attempts by others to enforce environmental standards as constraints on the most profitable use of resources. An argument might be made that improving environmental quality might be an appropriate national goal but does not fit

as part of a food policy. But an alternative case can be made that demonstrates the longer term importance of soil, water, and air quality to food production and hence, food security. The objective of improved environmental quality also suggests tradeoffs as well as complementarities with other food policy concerns. Those relationships can best be considered if improved environmental quality is included in a food policy framework.

- **Efficient and Competitive Structure of the Food Distribution System**—Over the past two decades, increasing attention has been given to the structure and organization of the food industry. Recent research and consumer interests have focused on growing concentration of market shares, especially in food manufacturing and food retailing.

From a food policy perspective, it is important to assure not only a healthy, viable food delivery system but one that also delivers food efficiently and at the lowest possible cost. This means it is important that no firm or group of firms possesses sufficient power to manipulate supply or price. Full efficiency also means that no artificial or arbitrary constraints, rules, regulations, or institutions hinder the flow of food and food services or stifle institutional and technological innovation.

- **Adequate and Competitive Levels of Returns to People, Organizations, and Resources Necessary to An Efficient System**—The need for adequate producer returns has already been discussed. In addition, hired farmworkers, workers in the rest of the food system, processing and distribution firms, and capital invested should earn fair and competitive returns. This goal is hardly controversial, at least in abstract terms, and is necessary to assure not only the well-being of important segments of the population but also the future flow of resources to the food system. Disagreement may arise over what the precise levels of returns should be, how they should be derived, and whether certain resources are essential to an efficient system. In general, all the major constituents of a national food policy would support the principle of adequate returns to all participants and resources needed in the food system.

- **Equitable Distribution of Returns and Economic Power**—Again, most people would endorse such a goal in the abstract. But attempts at implementation could be perceived as threats to existing institutions and power structures. When distributive goals are incorporated into policy, they are likely to be seen by some as essential to fairness and by others as social meddling. A policy of distributive equity could take an active direction by attempting to develop programs which assure equity or a neutral direction by assuring that public policies do not create or perpetuate inequities.

The broadening of the constituency base for food policy in recent years has brought an increased interest in having public policy assure equitable distributions of economic returns and power between the food system and the rest of the economy, among major stages of the food system, and among the participants within any given stage of the food system.

- **Resilience to Economic and Natural Disturbances**—One of the strengths frequently cited for a “family-oriented” agriculture has been the ability of farmers to “tighten their belts” to withstand periods of natural disaster and economic adversity. In so doing they have contributed greatly to our food security. Historically, this resilience has resulted from heavy dependence on internal resources, especially labor, for which low returns could be accepted in such periods. As agriculture has become more dependent on external financing and resources, concerns have been expressed that the more capital-intensive and debt-leveraged farm firms of today are vulnerable to cash flow disturbances. In addition, some have worried that an agriculture increasingly dominated by corporate-type farms employing hired labor and management does not have the flexibility (or the willingness) of family farms to accept low labor and management returns to survive periods of adversity. There is also concern that the rest of the food system not be dominated by a few large firms whose viability, and thus food security, could be threatened by economic misfortune.
- **Access to Food by all Segments of the Population**—Society, through the political process, has supported the goal of assuring that all Americans regardless of economic status have access to adequate levels of nutritious food. The goal has been to eliminate hunger and malnutrition, directly subsidizing the food of those unable to buy enough with their own resources. While the precise mechanisms and programs are certainly subject to debate, negotiation, and experimentation, the goal of assuring access to food by all is likely to be seen as an essential component of a national food policy.
- **Consistency with Other National Economic Goals and Policies**—While this goal could be defined so broadly as to be useless, it would be unrealistic to attempt to operate a food policy that ignored other key public concerns that could significantly affect or be affected by food policy. Examples include macroeconomic goals such as containing inflation, economic trade and balance-of-payment policies, foreign policy objectives where food exports or imports could play an important role, energy policies and goals, and domestic economic development policies. The importance of having food policy consistent with these other goals is problematical and will vary with time and circumstances.

Doubtless, any list of concerns appropriate to a national food policy will reflect to some degree the experiences and perceptions of those developing it. Also, there are many ways to express similar concerns. But, the list above captures the concerns and needs most frequently expressed by the various groups expressing strong interests in food and agricultural policies.

Ranking Food Policy Goals

What is the ultimate purpose of a food policy?

Certainly addressing each of the concerns already listed is thought to be important, at least by some. But the most basic requirement for human survival is access to food and water. Hence, a food policy that fails to provide adequate food for survival (in both quantity and nutrient content), short and long term, could hardly be considered acceptable. Thus, the ultimate test of a food policy is whether it assures opportunity for the nutritional well-being of the population.

Having established the ultimate objective of a food policy, one can set priorities on other goals in relation to it. The most important goals become those directly essential in the short term to the nutritional well-being of the population. Next come those goals less immediately essential to nutritional well-being but indirectly or eventually essential. Next in order of priority come those goals that, while highly desirable, are not essential for survival except in very indirect ways.

Using such criteria, an attempt follows to consolidate concerns listed earlier and to restate them as possible goals for a national food policy. The order of listing suggests a possible order of priority:

– Security of food supply.

- Assurance of adequate supplies of safe and wholesome food.

– Accessibility of food by all segments of population.

- An effective distribution system.
- Reasonable food prices (affordable to most).
- Assured nutritional well-being of those unable to purchase food from their own resources.

– Economically healthy and viable food production and distribution system.

- All resources used efficiently.
- Rewards and incentives adequate for all necessary participants.
- System resilient to economic and natural adversity.
- Minimum vulnerability to concentrations of power.
- Increasing productivity and production capacity.

– Prudent use of resources.

- Conservation and prudent use of land and water.
- Efficient use of energy.
- Prudent use of agricultural resources to produce energy.
- Preservation of resources and resource flexibility for future use.
- Preservation and enhancement of soil, water, and air quality.

– Equitable distribution of economic rewards and power.

- Between food system and other economic sectors.
- Among stages and components of the food system.
- Among participants within each stage of the food system.
- Equitable access to entry into the system by new farmers and firms.
- Elimination of unfair and inequitable practices.
- Equitable access to the services of land, capital, and other resource services by tenants and other nonowners.

– Access to market and consumer information.

- Market and price information and outlook to facilitate competitive behavior in markets throughout the food system.
- Consumer access to information to assure informed choices regarding nutrition, health, and economic value when buying food.

– Food system structure and performance consistent with other national goals and policies.

- Economic opportunity for the maximum number of individuals.
- Economic structure of food system which preserves flexibility for the future.
- Minimum regulatory burden on food system participants.
- Consistent with energy policies and goals.
- Consistent with anti-inflation and other macroeconomic policies and goals.
- Consistent with trade and balance-of-payment policies and goals.
- Consistent with economic development and rural development policies and goals, domestic and international.

When one evaluates the goals listed above, it becomes clear that most of them serve at least two purposes: they are desirable ends in and of themselves, and they support other goals and ultimately the basic objective of a food policy. Thus, the goals are both ends and means to ends. From what has been said, we can deduce at least two compelling reasons

to articulate an explicit food policy: to more effectively and efficiently assure the nutritional well-being of the population, and to bring order and direction to a host of subsidiary concerns and goals.

Several topics of considerable recent interest—such as the structure of the farm sector and environmental quality—may not appear to have received adequate attention. However, the essential content of these concerns are treated under other goals. To list them separately would constitute some duplication. Structural concerns over concentration of power in fewer but larger firms, equitable distribution of economic power, opportunity for entry by nonparticipants, economic opportunities for the maximum number of individuals, and equitable access to resources by all producers are covered under several other goals. Environmental enhancement is covered under prudent use of resources. Again, the various desired achievements of a food policy could be combined and expressed in numerous ways. The list may serve as a useful point of departure.

Implementing a National Food Policy: Linking Goals With Programs

A food policy provides a means for sorting out goals and priorities; it also provides a framework and criteria for pro-

posing, evaluating, modifying, and managing programs and agencies. Those programs, in turn, are the means for implementing food policy goals.

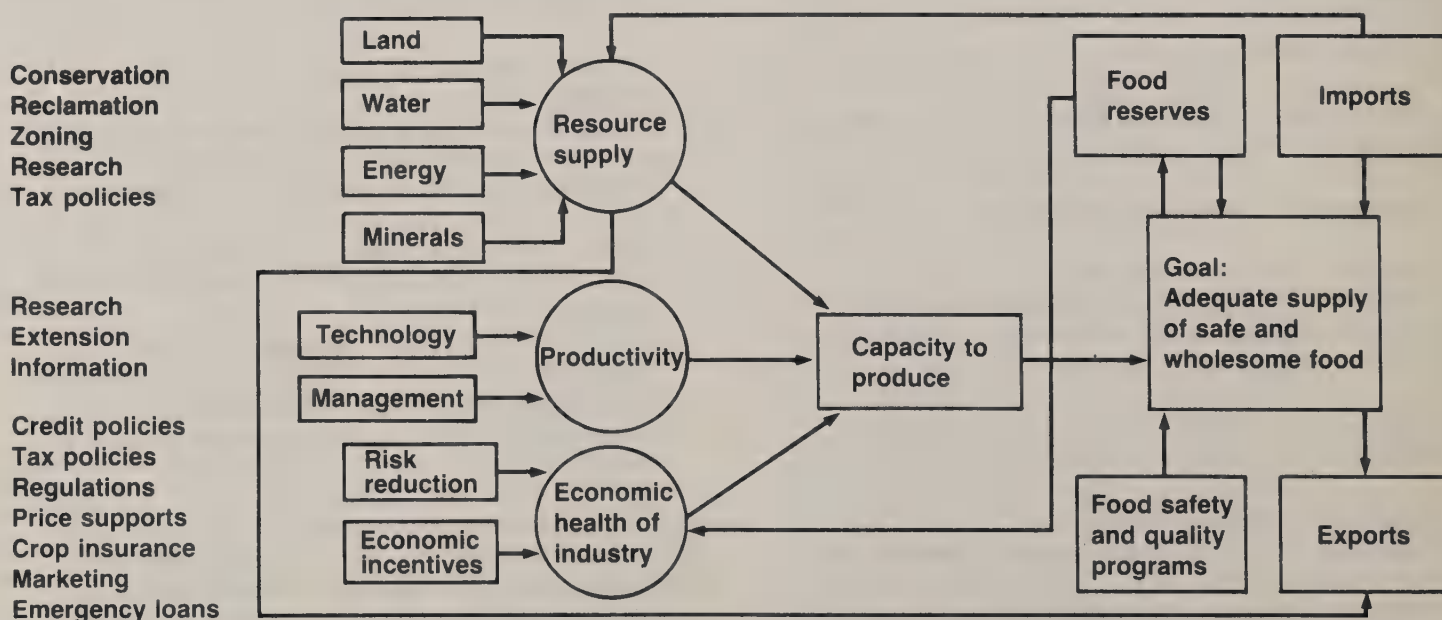
Frequently programs are managed as ends unto themselves without clear understanding and agreement of the goal to be achieved and how that goal fits into a broader mission or purpose. It is not surprising that under such circumstances programs often are ineffective or operate at cross purposes. This section shows how programs might be aligned with the various goals discussed earlier to implement an explicit food policy. The point is illustrated by examining how programs might be managed to achieve the goal of food security.

Assuring the American people adequate supplies of safe and wholesome food involves a host of public policies and programs. Domestic food supplies come primarily from domestic food production and imports. In any given year those supplies can be augmented by reserves carried over from a previous year and depleted by exports. Thus, our policies regarding food trade, reserves, and domestic production are important determinants of food security in the near term. For the longer term, the economic health and viability of businesses in the food system, the supply of productive resources, and the productivity of those resources are critical. These latter factors are also affected by a number of policies and programs.

Figure 2 can be used as a guide to trace the relationship of

Figure 2

Program linkages to the goal of food security



a number of program areas to the goal of food security (assuring adequate supplies of safe and wholesome food at reasonable cost). We can see that the most important contributor to food security is our domestic capacity to produce. At any one time, that capacity is a function of the amount of resources available, their productivity, and the economic capability of the country and of producers to make the best use of resources available. The last requirement is enhanced by policies that reduce risk in the production sector (crop insurance, economic and disaster emergency loans, price stabilization programs, and loan and reserves programs), assure the availability of adequate production and investment capital (loan and credit programs), and otherwise provide economic incentives to produce (tax policies, and price and income support programs). Thus, it is clear that the goal of having an economically healthy and viable food system is almost inseparable from the goal of food security.

A major component of assuring adequate capacity to produce is protection and enhancement of the resource base. In agriculture, the most obvious examples are the land and water resources. The quality and supply of land and water are directly affected by programs of USDA's Soil Conservation Service, and indirectly affected by tillage research, forage research, and other research and programs on erosion, soil runoff, saline seep, and water pollution. Equally important are policies affecting patterns of land and water use (highway development, coal slurry pipelines, regional development, land use zoning, and property taxes). Moreover, the goal of good resource stewardship and enhancement of future production capacity provides criteria for judging the highest priority uses of fixed-supply resources that are consumed in the production process. Examples include nonrecharging water aquifers and deposits of phosphate and potash.¹

Production capacity is also affected by the availability and character of resources other than land and water—such as energy. An important objective of energy policy must be to assure needed supplies and forms of energy to meet food production needs.

Another major element of domestic capacity to produce is the productivity of the resource base. Productivity, in turn, is

¹ Much of the water in the Texas High Plains portion of the Ogallala aquifer was pumped out during the fifties, sixties, and seventies to produce cotton and grain sorghum which were in surplus supply during much of that time (and thus had a negative marginal social value) but which were profitable to produce (and irrigate) only because of public subsidies via the Federal farm commodity programs. Thus, the general public was taxed to underwrite exploitation of a once-and-for-all resource which may be sorely needed for future food production. An explicit food policy with goals like those suggested earlier would provide an improved framework for examining whether production patterns and practices stimulated by existing policies and programs are consistent with the most desirable use and timing of use of limited resources.

a product of technology and management. Technology is very much a product of public research and research policies. If the perceptions stated earlier of tightening supply/demand balances and a highly concentrated production sector are essentially correct, the goal of food security would suggest that future emphasis be put on yield- and output-enhancing research (higher yielding plant varieties, improved feed conversion efficiency of livestock, improved energy efficiency, plant and animal disease control, pest control, and waste reduction) rather than research that enhances one person's or family's span of control over resources (super-large tractors, large-scale harvesters) but which may contribute to further concentration of economic power while adding little to production efficiency or capacity.

Effective use of technology to improve productivity is partly a function of management information. In this regard, public information and education programs have a role to play.

Even from this superficial treatment it is clear that a broad array of public programs, many the responsibility of USDA, have an important impact on the domestic food production potential, which is, in turn, the most important determinant of U.S. food security.

The link between trade policies and domestic food security deserves further comment. First, we must consider our import policies. If other countries have a comparative advantage in producing certain foods, purchasing those foods rather than trying to produce them domestically represents prudent use of domestic resources. If any of those imported foods are considered essential to the nutritional well-being of U.S. consumers, an important objective of trade policy must be that of reducing domestic vulnerability to instability in supplies and prices of those foods. Likewise, food security requires that steps be taken to reduce vulnerability where imports contribute to supplies of productive resources (such as petroleum and potash).

Some of the more important future issues for food policy are posed by the rapidly increasing role of food exports. Ultimately, tradeoffs among agricultural, natural resources, and trade policies, and their consistency or lack thereof, might come into question. Further, if our food policy is broadened to include concern for the nutritional well-being of others in the world, the conditions and concerns described could lead to the question of who receives our exports, especially if the exports are indirectly subsidized, or fail to cover all domestic social costs. Do we ration our exports to the most needy? Or do we let the wealthier, better fed nations have our food only if they are willing to purchase processed goods which are high-valued and which create jobs for Americans.

Finally, food security is not complete unless there is some assurance that the food supply is edible and safe from contamination. To this end, all participants in the food system—from producers to consumers—have a stake in the effectiveness (and efficiency) of Federal and State policies and programs to assure food safety and quality. The meat and poultry inspection services, product grading services, and other food safety and quality monitoring responsibilities of USDA are thus critical components of a food policy and contribute importantly to the goal of food security. To be most effective, these programs must assure food safety and quality, and do so in a way that does not unduly hinder or make the orderly working of the food production and distribution process more costly.

The preceding discussion oversimplifies the complex set of public and private forces—economic and otherwise—that bear on the issue of food security. But it does illustrate the public policy and program “handles” that can be managed to enhance the likelihood of achieving the goals of food policy.

Similar analyses could be made of means for achieving the other goals of a food policy and how those means relate to the programs and responsibilities of public agencies, mostly

but not entirely, within USDA. Those analyses would reveal that actions taken to achieve one goal are often consistent with achieving other food policy goals. Occasionally a trade-off will be revealed. The clear identification of a conflict could lead to exploring alternative programs or approaches to the issue to minimize or eliminate the conflict. In other words, the hierarchy of food policy goals would become a conscious and deliberate frame of reference for making program management decisions and for evaluating program effectiveness.

Conclusion

The specific objectives and priorities of a national food policy are properly determined within the political process. A careful sorting out of the cacophony of public concerns under the general heading of food and agriculture will yield a reasonable consensus on the basic purposes of food and agricultural policy and a hierarchy of specific goals. These can provide a clearer sense of direction and order to public food policies and to the programs of the Department of Agriculture. Moreover, these goals and priorities can be a powerful tool for effective and efficient management of food-related programs and agencies.

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